

Supplementary Materials

Synthesis, structure and cytotoxicity testing of novel 7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-aryl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-imine derivatives

Łukasz Balewski^{1,*}, Franciszek Sączewski^{1,†}, Patrick J. Bednarski², Lisa Wolff², Anna Nadworska¹,
Maria Gdaniec³, and Anita Kornicka¹

¹ Department of Chemical Technology of Drugs, Faculty of Pharmacy, Medical University of Gdańsk,
Al. Gen. J. Hallera 107, 80-416 Gdańsk, Poland;

² Department of Pharmaceutical and Medicinal Chemistry, Institute of Pharmacy, University of Greifswald,
F.-L. Jahn Strasse 17, D-17489 Greifswald, Germany;

³ Faculty of Chemistry, Adam Mickiewicz University,
ul. Uniwersytetu Poznańskiego 8, 61-614 Poznań, Poland;

* Author to whom correspondence should be addressed;

E-Mail: lukasz.balewski@gumed.edu.pl

† Deceased 18 October 2018

Synthesis of compounds **1a-c** and **2**

1-Phenylhydrazinecarbonitrile (1a)

Cyanogen bromide (7.41 g; 70 mmol) was dissolved in 30 ml of ethanol and added dropwise with stirring over 15 min. into 180 ml of water at room temperature (20-22°C). Phenylhydrazine (7.57 g, 70 mmol) was dissolved in 10 ml of ethanol and added dropwise into the resulting mixture. The mixture was kept at ambient temperature for 1.5 h and cooled in an ice bath. The precipitate was filtered, washed with a small amount of water, and dried. The crude product was purified by column chromatography (eluent: dichloromethane or chloroform); yield 2.8 g (30%); m.p. 80-82°C; IR (KBr, cm^{-1}): 3360, 3283, 3039, 2925, 2278, 2204, 1623, 1597, 1496, 1458, 1310, 1214, 1175, 1147, 1063, 1023, 887, 750, 741, 688; m/z (ESI): 134 $[\text{M}+\text{H}]^+$. Anal. Calcd for $\text{C}_7\text{H}_7\text{N}_3$ (133.15): C, 63.14; H, 5.30; N, 31.56. Found: C, 63.09; H, 5.28; N, 31.48.

1-(p-Tolyl)hydrazinecarbonitrile (1b)

p-Tolylhydrazine hydrochloride (5.0 g; 31.52 mmol) was added into 100 ml of 5% NaOH at temperatures below 20-22°C. The resulting suspension was then extracted with diethyl ether (4x25 ml). The combined organic extract was dried with anhydrous magnesium sulfate(VI), filtered, and concentrated under reduced pressure. Cyanogen bromide (2.90 g; 27.3 mmol) was dissolved in 10 ml of ethanol and added dropwise with stirring over 15 min. into 100 ml of water at room temperature (20-22°C). Crude *p*-tolylhydrazine (3.34 g, 27.3 mmol) was dissolved in 15 ml of ethanol and added dropwise into the resulting mixture. The mixture was kept at ambient temperature for 3 h and cooled in an ice bath. The precipitate was filtered, washed with a small amount of water, and dried. The crude product was purified by column chromatography (eluent: dichloromethane); yield 1.2 g (30%); m.p. 71-73°C; IR (KBr, cm^{-1}): 3404, 3317, 3205, 3073, 2943, 2862, 1678, 1626, 1591, 1533, 1500, 1457, 1386, 1330, 1287, 1251, 1217, 1104, 1055, 1027, 992, 927, 902, 872, 801, 759, 707, 697, 652, 610; m/z (ESI): 148 $[\text{M}+\text{H}]^+$. Anal. Calcd for $\text{C}_8\text{H}_9\text{N}_3$ (147.18): C, 65.29; H, 6.16; N, 28.55. Found: C, 65.34; H, 6.08; N, 28.49.

1-(4-Chlorophenyl)hydrazinecarbonitrile (1c)

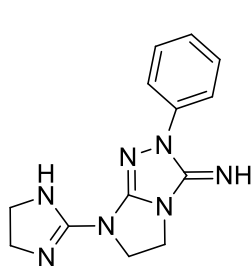
(4-Chlorophenyl)hydrazine hydrochloride (5.0 g; 27.925 mmol) was added into 60-70 ml of 5% NaOH at temperatures below 20-22°C. The resulting suspension was then extracted with diethyl ether (4x20 ml). The combined organic extract was dried with anhydrous magnesium sulfate(VI), filtered, and concentrated under reduced pressure. Cyanogen bromide (2.82 g; 26.6 mmol) was dissolved in 20 ml of ethanol and added dropwise with stirring over 15 min. into 130 ml of water at room temperature (20-22°C). Crude (4-chlorophenyl)hydrazine (3.8 g; 26.65 mmol) was dissolved in 20 ml of ethanol and added dropwise into the solution of cyanogen bromide at room temperature (20-22°C). The mixture was kept at ambient temperature for 3 h and cooled in an acetone-ice bath (-10°C). The precipitate was filtered, washed with a small amount of water, and dried. The crude product quickly turned dark by air and was purified by column chromatography (eluent: dichloromethane); yield 1.6 g (36%); m.p. 74-79°C; IR (KBr, cm⁻¹): 3338, 3278, 3197, 3097, 3069, 2209, 1624, 1595, 1491, 1269, 1093, 819, 807, 555, 497; m/z (ESI): 168 [M+H]⁺. Anal. Calcd for C₇H₆ClN₃ (167.60): C, 50.17; H, 3.61; N, 25.07. Found: C, 50.12; H, 3.65; N, 24.91.

2-Chloro-4,5-dihydro-1H-imidazole (solution in dichloromethane) (2)

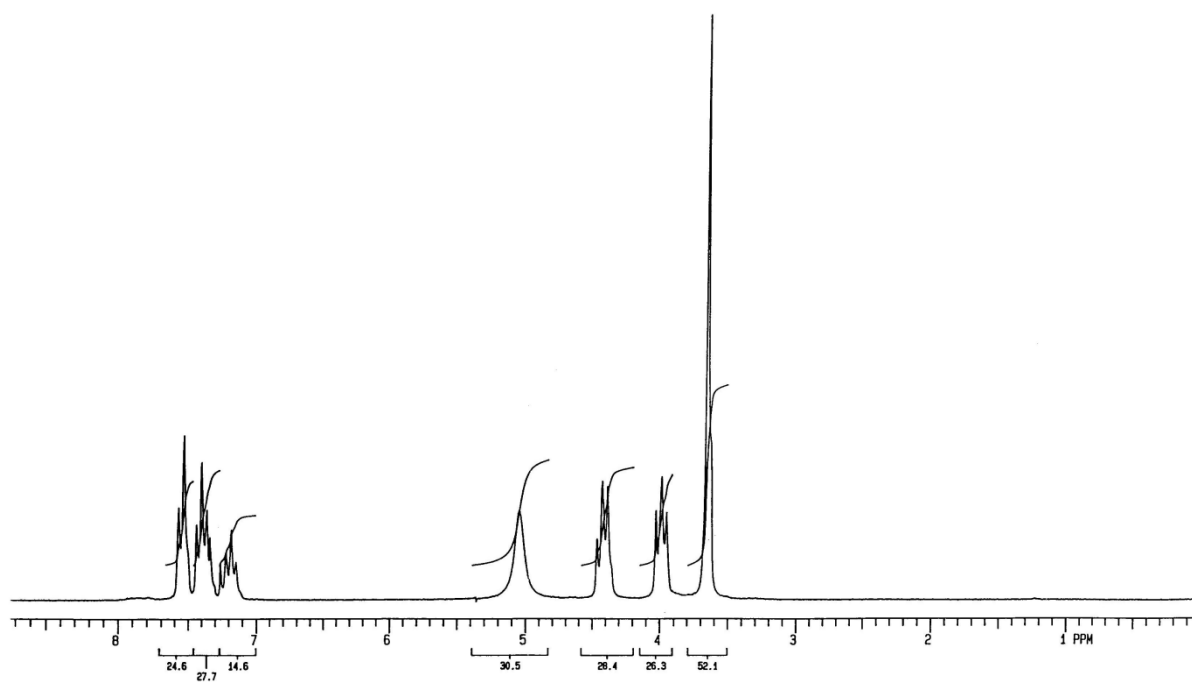
2-Chloro-4,5-dihydro-1H-imidazole hydrogen sulfate(VI) (5.0 g, 25.0 mmol) was added portion-wise to 50 ml of a 5% sodium hydroxide solution at temperatures below 10°C. The resulting solution was then extracted with dichloromethane (4x20 ml). The combined organic extract was dried with anhydrous magnesium sulfate(VI), filtered, and concentrated to a volume of 25-30 ml (solution of 2.5 g, 25 mmol of 2-chloro-4,5-dihydro-1H-imidazole in dichloromethane).

Copies of ^1H -NMR and ^{13}C -NMR spectra

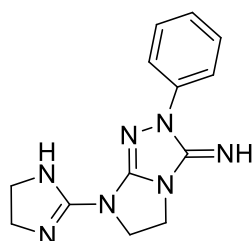
^1H -NMR (CDCl_3 , 200 MHz) spectrum of 7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-imine (**3a**)



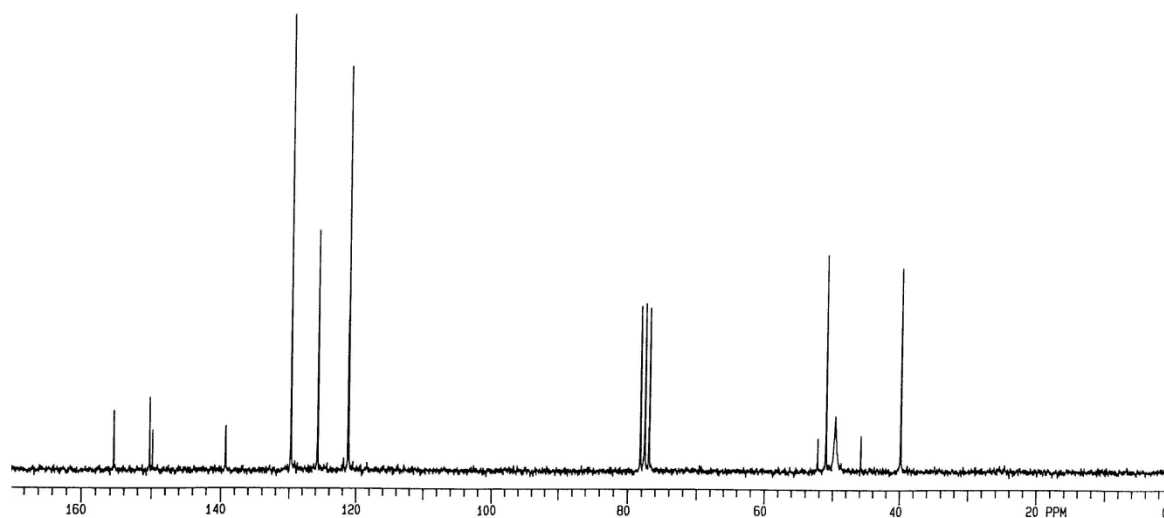
FREQ	PPM	INTENSITY	^{13}C 1	^{13}C 2	^{13}C 3
1514.40	7.573	26.908	1009.45	5.048	25.935
1506.34	7.533	47.871	893.25	4.467	17.782
1488.03	7.441	21.906	886.00	4.431	34.469
1480.42	7.403	39.916	884.09	4.421	28.346
1472.64	7.364	26.337	877.86	4.390	32.950
1467.88	7.340	18.315	866.07	4.031	25.955
1460.72	7.304	4.396	797.65	3.989	35.711
1452.41	7.263	10.568	790.69	3.954	25.456
1444.23	7.222	13.817	783.65	3.919	7.893
1436.83	7.185	20.399	782.55	3.913	7.619
1429.58	7.149	11.107	776.40	3.882	13.959
			772.37	3.862	8.632
			732.45	3.663	167.711



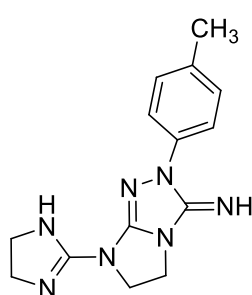
^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of 7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-imine (**3a**)



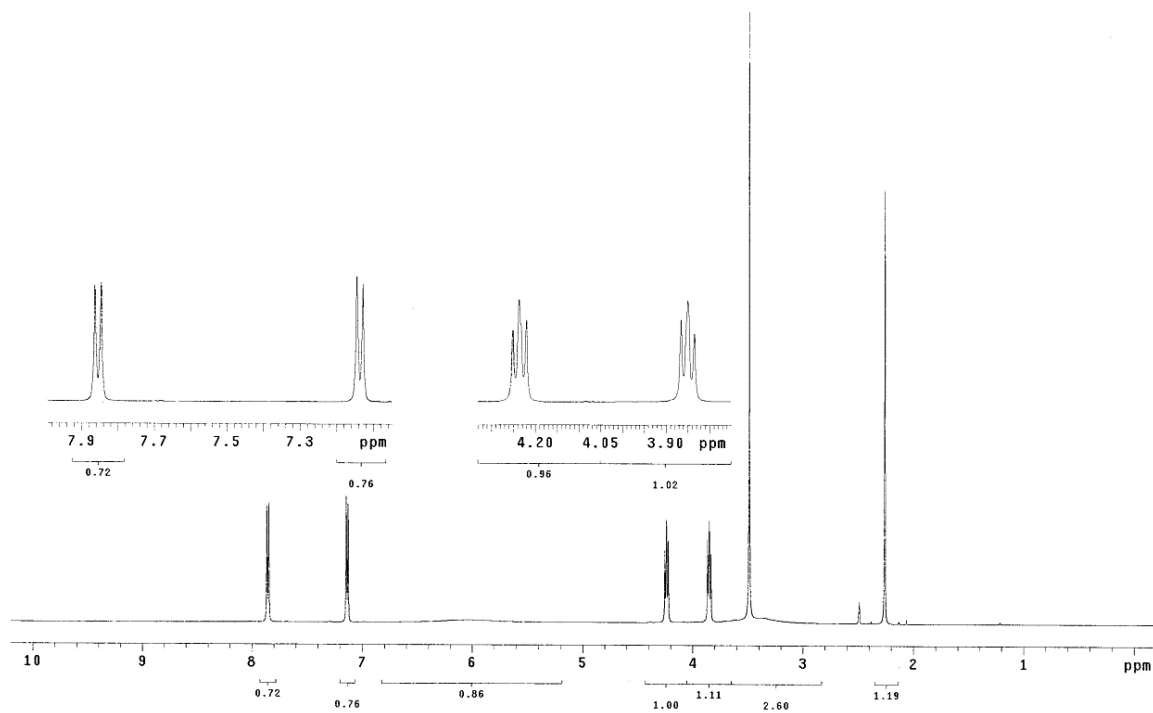
FREQ	PPM	INTENSITY
7020.6	155.512	17.212
7556.9	150.269	20.835
7535.3	149.838	11.998
7005.5	139.304	13.912
6523.9	129.726	131.262
6476.1	128.776	5.224
6322.3	125.719	68.909
6093.3	121.166	123.975
3932.4	78.196	43.240
3900.5	77.561	51.039
3868.5	76.924	49.754
2828.4	52.265	10.007
2566.6	51.036	63.431
2493.8	49.589	15.988
2305.0	45.835	10.347
2005.6	39.881	60.221



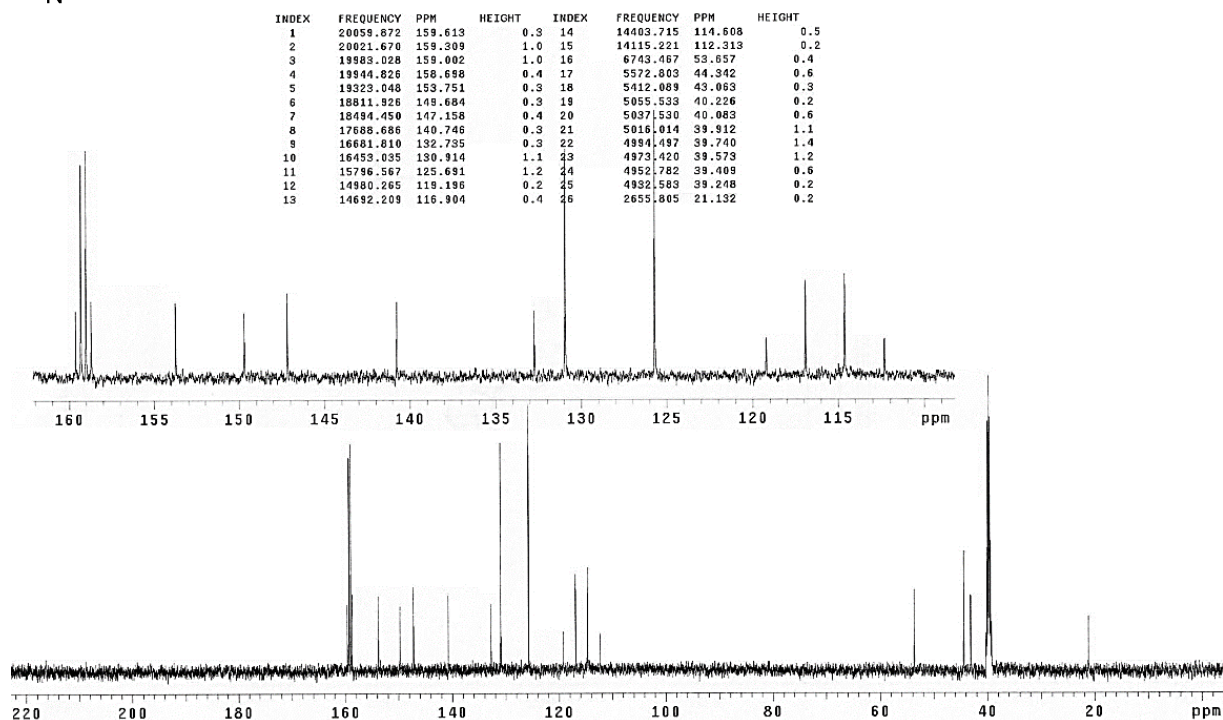
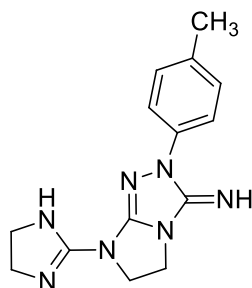
^1H -NMR ($\text{DMSO-}d_6$, 500 MHz) spectrum of 7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-imine (**3b**)



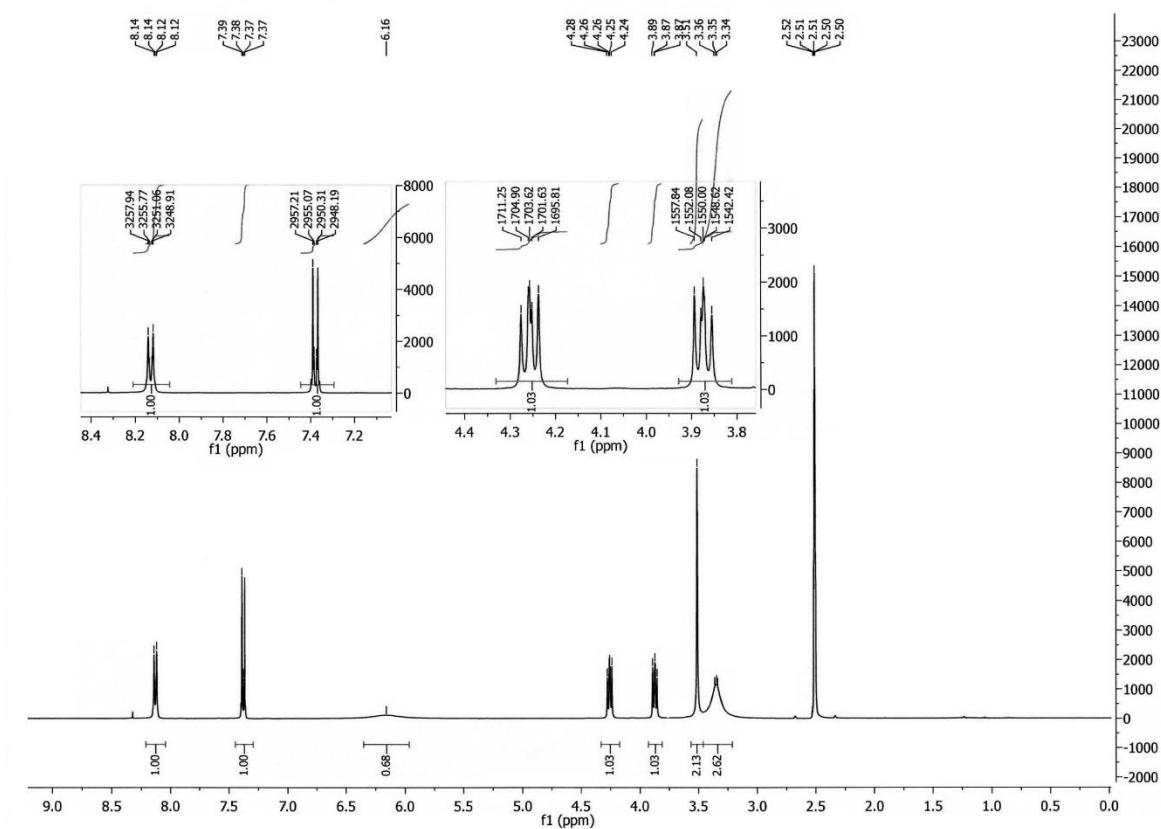
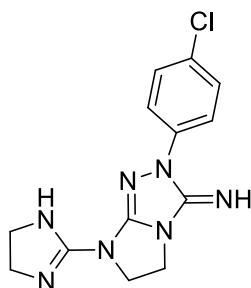
FREQUENCY	PPM	HEIGHT
3930.129	7.863	74.0
3921.339	7.846	75.6
3571.220	7.145	80.2
3562.431	7.128	75.4
2124.843	4.251	46.3
2118.007	4.238	65.9
2109.217	4.220	52.6
1931.472	3.864	53.1
1923.659	3.849	65.6
1916.334	3.834	44.2
1741.519	3.484	390.5
1244.907	2.491	11.3
1243.442	2.488	14.0
1128.200	2.257	275.9



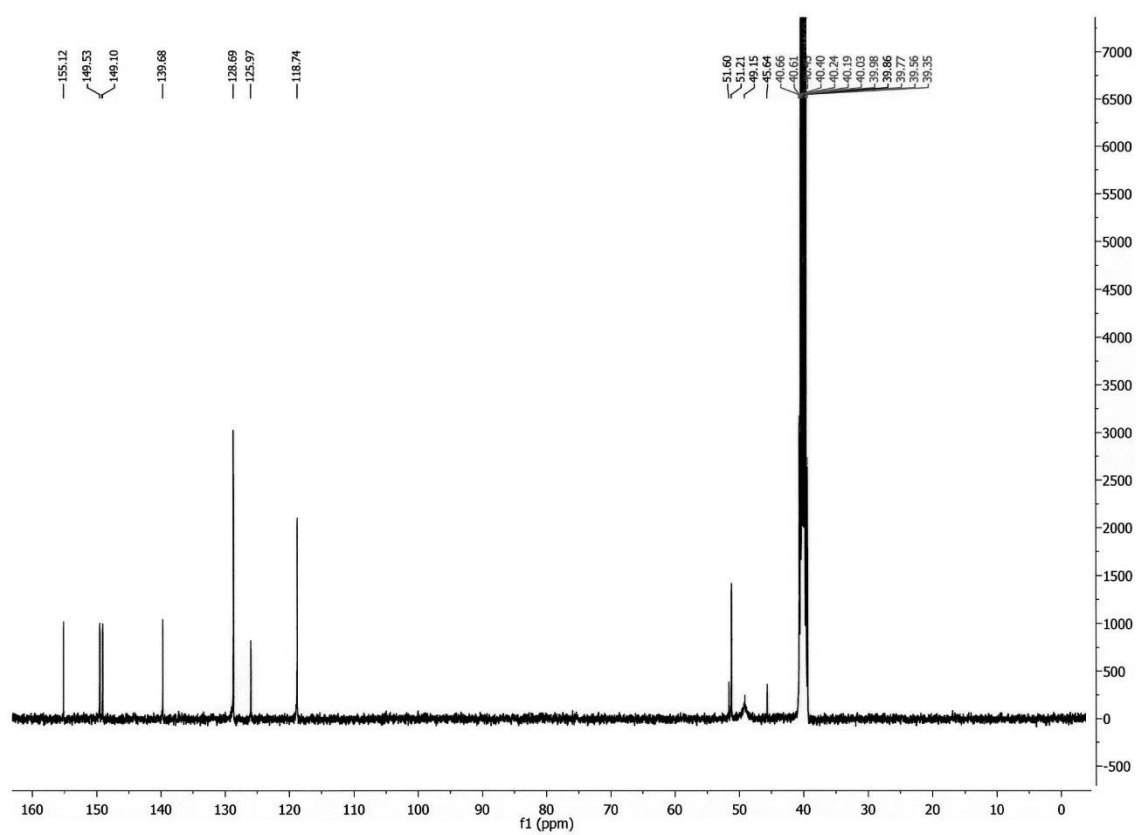
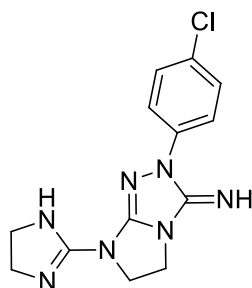
^{13}C -NMR (DMSO- d_6 +TFA, 125 MHz) spectrum of 7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-imine (**3b**)



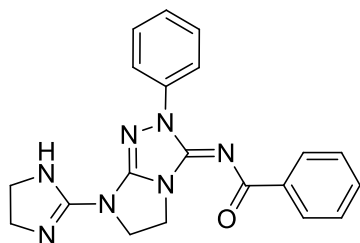
^1H -NMR (DMSO- d_6 , 400 MHz) spectrum of 2-(4-chlorophenyl)-7-(4,5-dihydro-1H-imidazol-2-yl)-6,7-dihydro-2H-imidazo[2,1-c][1,2,4]triazol-3(5H)-imine (**3c**)



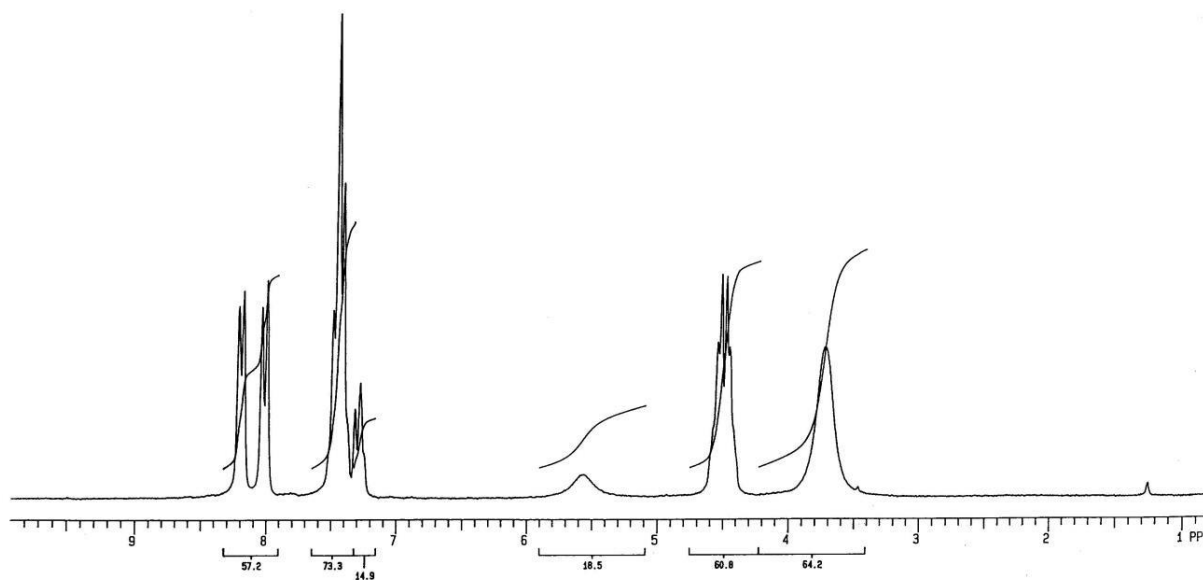
^{13}C -NMR ($\text{DMSO-}d_6$, 100 MHz) spectrum of 2-(4-chlorophenyl)-7-(4,5-dihydro-1H-imidazol-2-yl)-6,7-dihydro-2H-imidazo[2,1-c][1,2,4]triazol-3(5H)-imine (**3c**)



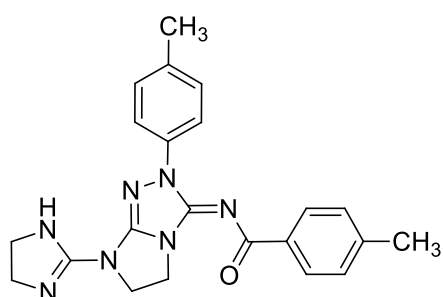
¹H-NMR (CDCl₃, 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzamide (**4a**)



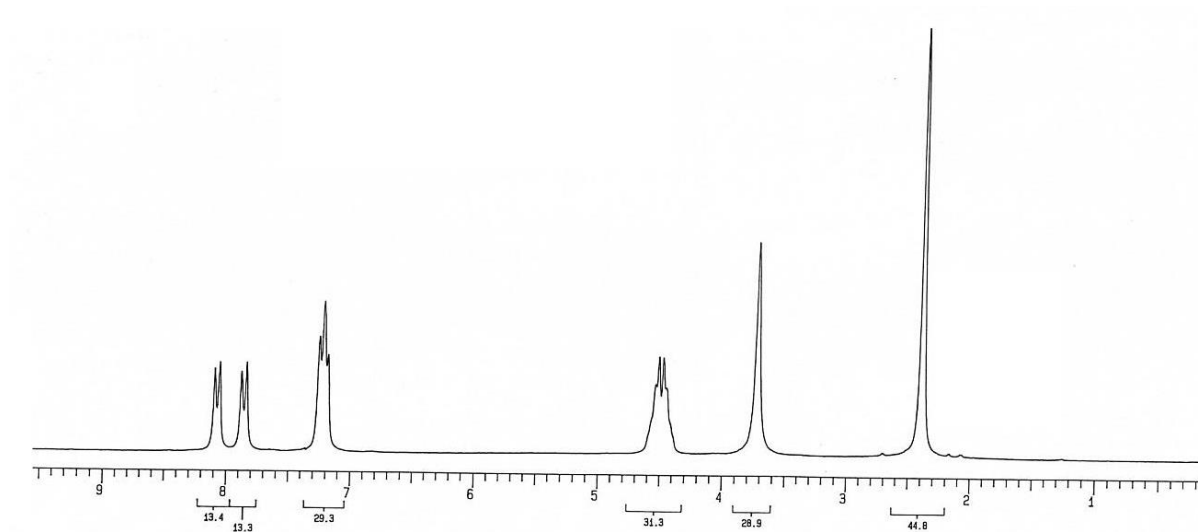
FREQ	PPM	INTENSITY			
1642.93	8.216	58.082	1450.01	7.261	14.752
1635.79	8.180	62.546	1117.92	5.590	7.885
1607.43	8.038	57.798	1114.95	5.575	8.082
1599.55	7.999	65.773	1113.51	5.568	8.106
1497.34	7.488	56.888	1111.88	5.560	8.179
1490.04	7.451	143.897	1109.90	5.550	7.950
1482.26	7.412	94.244	909.35	4.547	47.121
1472.00	7.361	15.240	903.42	4.510	67.102
1470.48	7.353	8.638	895.76	4.479	66.511
1459.39	7.348	7.956	890.09	4.451	45.683
1453.23	7.317	27.737	745.53	3.727	45.700
1455.06	7.276	35.385	743.93	3.720	45.465



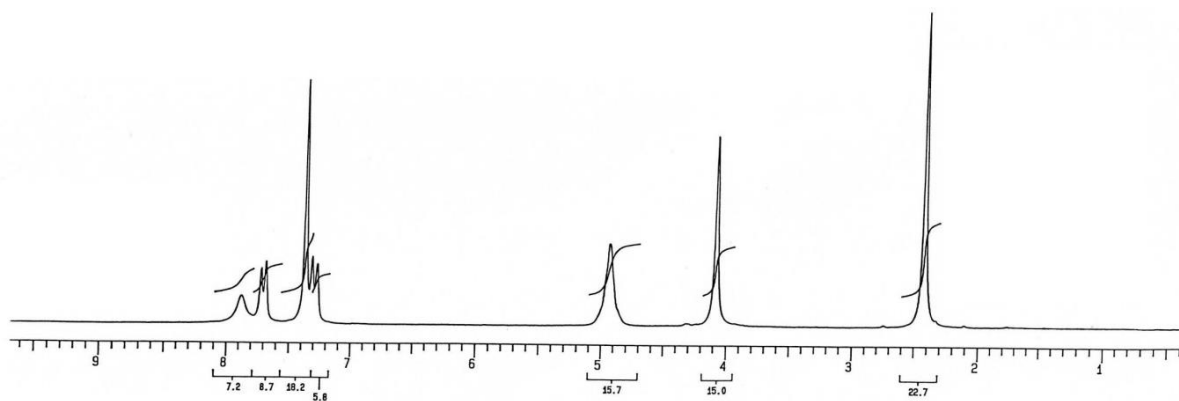
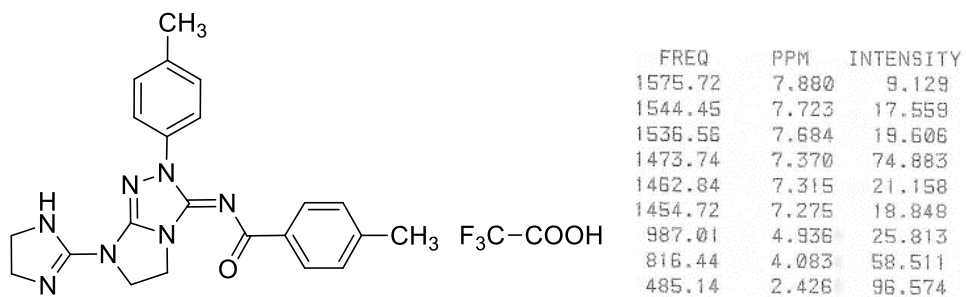
^1H -NMR (CDCl_3 , 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-methylbenzamide (**4b**)



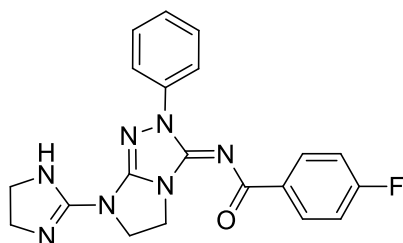
FREQ	PPM	INTENSITY
1619.15	8.097	24.459
1611.27	8.057	26.243
1576.18	7.882	23.565
1567.88	7.840	26.152
1451.37	7.258	33.995
1444.64	7.224	43.972
1437.73	7.190	28.693
907.43	4.538	21.059
902.33	4.512	29.130
895.09	4.476	28.891
889.80	4.450	19.988
744.80	3.724	62.446
478.13	2.391	124.946



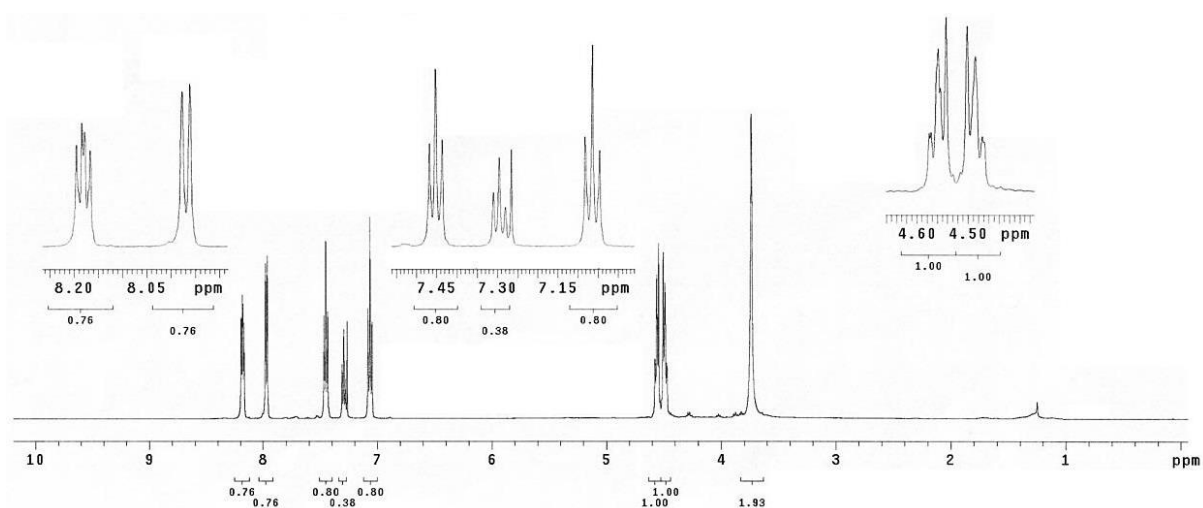
^1H -NMR (CDCl_3+TFA , 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-methylbenzamide (**4b**)



^1H -NMR (CDCl_3 , 500 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-fluorobenzamide (**4c**)

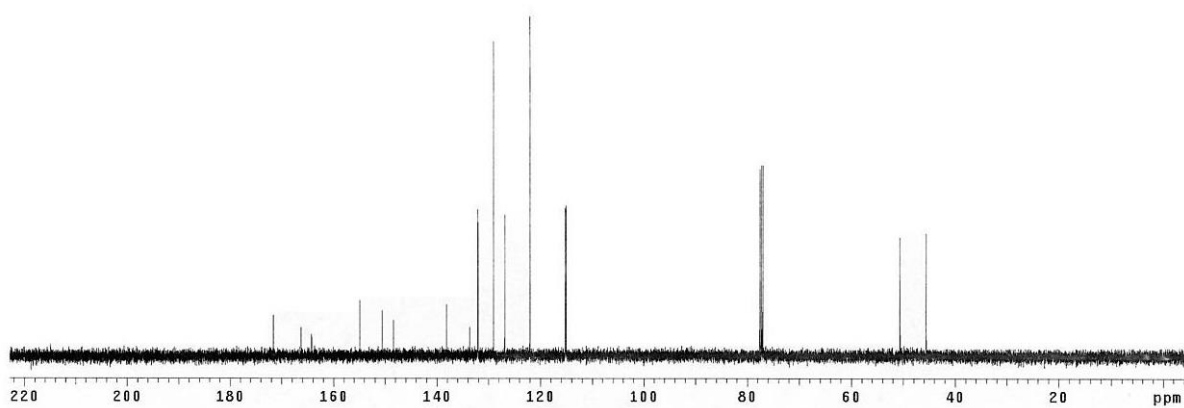
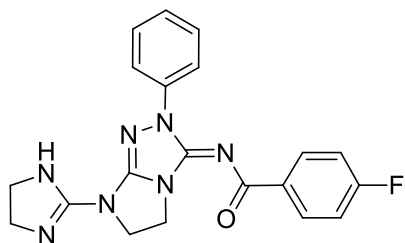


INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	4095.657	8.194	24.3	17	2286.953	4.576	14.2
2	4090.286	8.184	29.6	18	2285.000	4.572	14.3
3	4087.356	8.178	27.4	19	2278.163	4.558	34.4
4	4081.496	8.166	23.0	20	2276.210	4.554	25.0
5	3986.764	7.977	37.0	21	2270.350	4.542	41.9
6	3978.951	7.961	38.8	22	2256.678	4.515	5.0
7	3732.354	7.468	24.6	23	2249.841	4.501	39.8
8	3725.029	7.453	42.5	24	2242.028	4.486	32.5
9	3716.728	7.436	25.6	25	2235.192	4.472	13.3
10	3653.247	7.309	13.0	26	2233.239	4.468	12.1
11	3645.923	7.295	21.3	27	1868.470	3.738	72.8
12	3638.598	7.280	9.5				
13	3630.785	7.264	23.2				
14	3538.982	7.081	26.2				
15	3530.193	7.063	48.2				
16	3521.403	7.045	23.1				

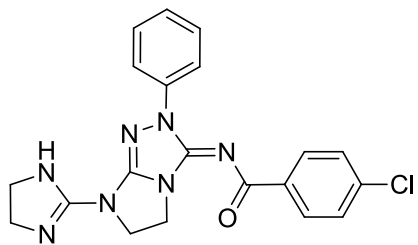


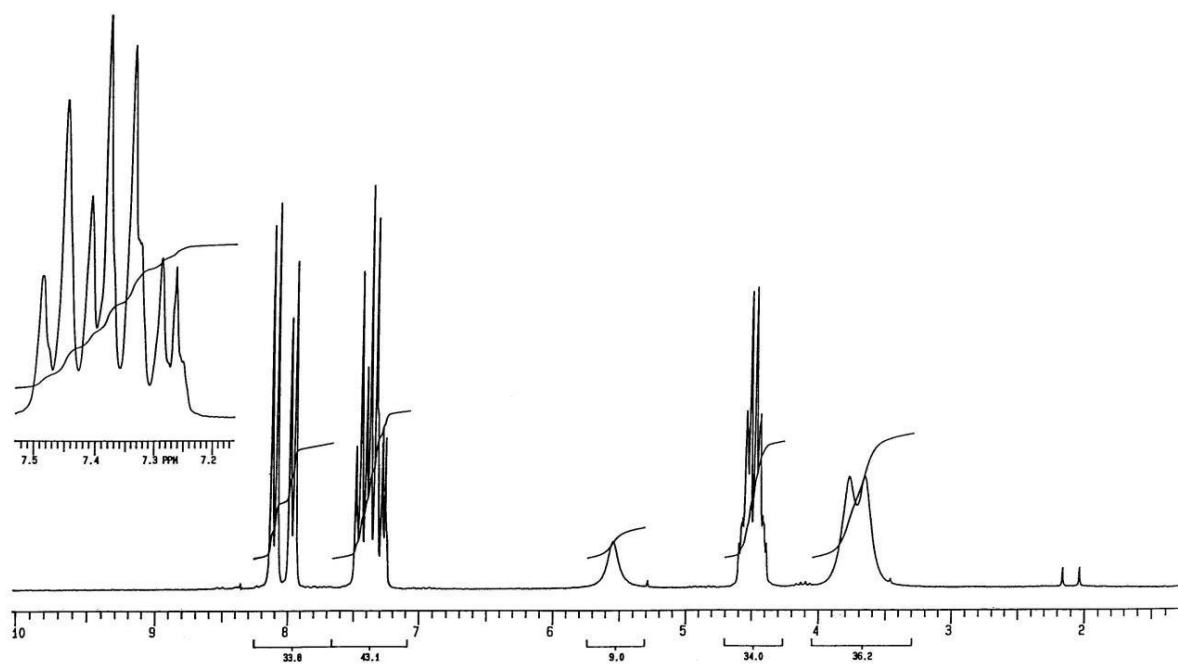
^{13}C -NMR (CDCl_3 , 125 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-fluorobenzamide (**4c**)

INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	21565.541	171.595	0.4	21	5726.896	45.568	1.3
2	20888.875	166.210	0.3				
3	20638.144	164.215	0.2				
4	19460.894	154.848	0.6				
5	18922.986	150.568	0.5				
6	18646.347	148.367	0.4				
7	17358.881	138.123	0.5				
8	16795.944	133.643	0.3				
9	16792.870	133.619	0.3				
10	16601.419	132.096	1.5				
11	16592.197	132.022	1.4				
12	16213.247	129.007	3.3				
13	15941.439	126.844	1.5				
14	15333.273	122.005	3.5				
15	14475.694	115.182	1.5				
16	14454.178	115.010	1.6				
17	9745.178	77.541	1.9				
18	9713.562	77.290	2.0				
19	9681.507	77.035	2.0				
20	6361.847	50.621	1.2				

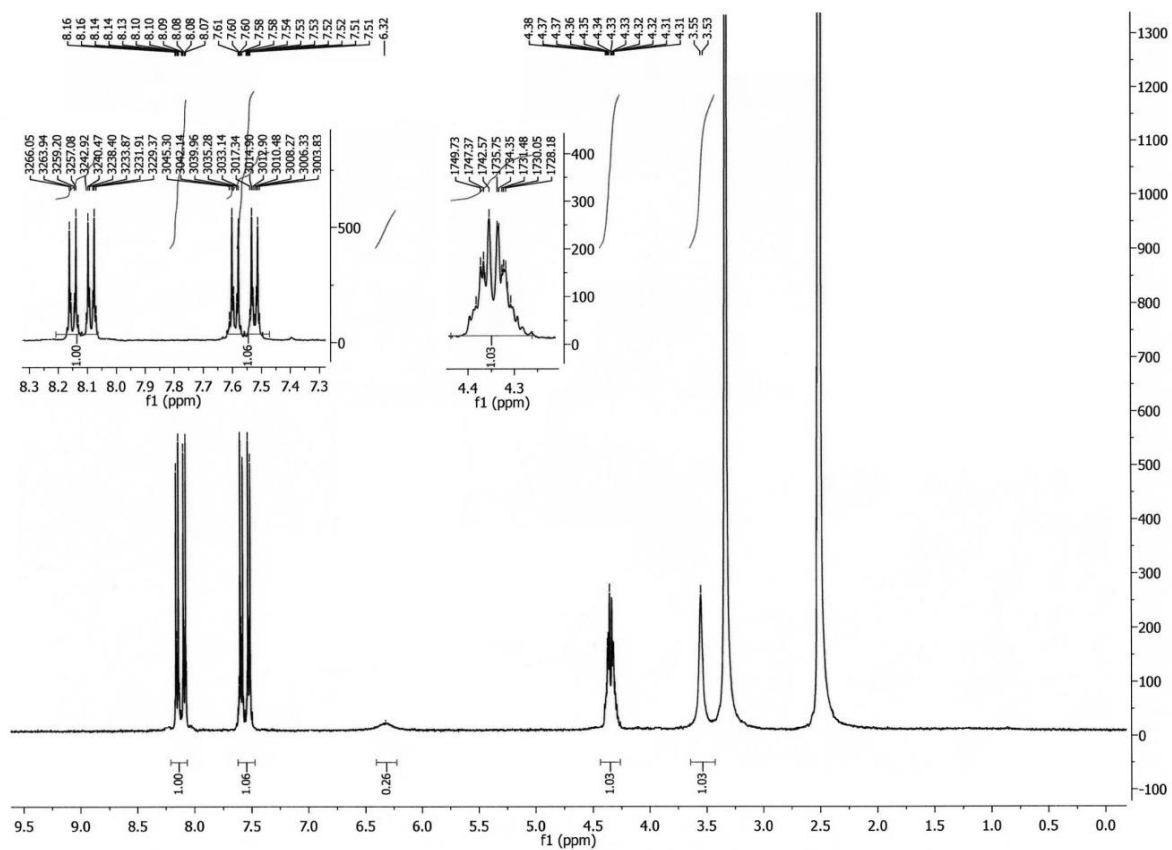
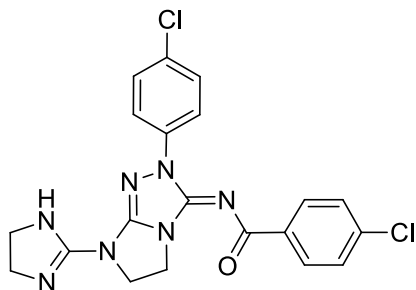


^1H -NMR (CDCl_3 , 200 MHz) spectrum of 4-chloro-*N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzamide (**4d**)

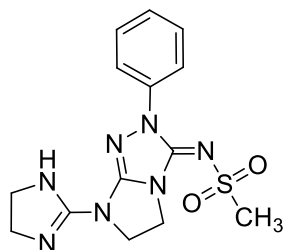
	FREQ	PPM	INTENSITY			
	1625.81	8.130	107.112	1109.03	5.546	14.794
	1617.28	8.087	113.762	920.27	4.602	14.326
	1596.77	7.985	80.376	916.73	4.584	20.281
	1589.13	7.947	96.787	914.63	4.574	21.811
	1497.06	7.486	42.841	910.32	4.552	53.002
	1489.88	7.450	93.800	908.27	4.542	48.270
	1481.67	7.409	65.922	903.60	4.519	87.382
	1476.17	7.382	119.739	896.16	4.481	88.706
	1467.57	7.339	109.294	889.23	4.447	51.929
	1465.71	7.329	53.144	884.56	4.423	22.337
	1457.66	7.289	47.908	882.77	4.414	20.254
	1452.63	7.264	45.428	878.98	4.395	14.264
	1450.13	7.252	17.646	756.07	3.781	33.778
	1110.25	5.552	14.912	733.50	3.658	34.032



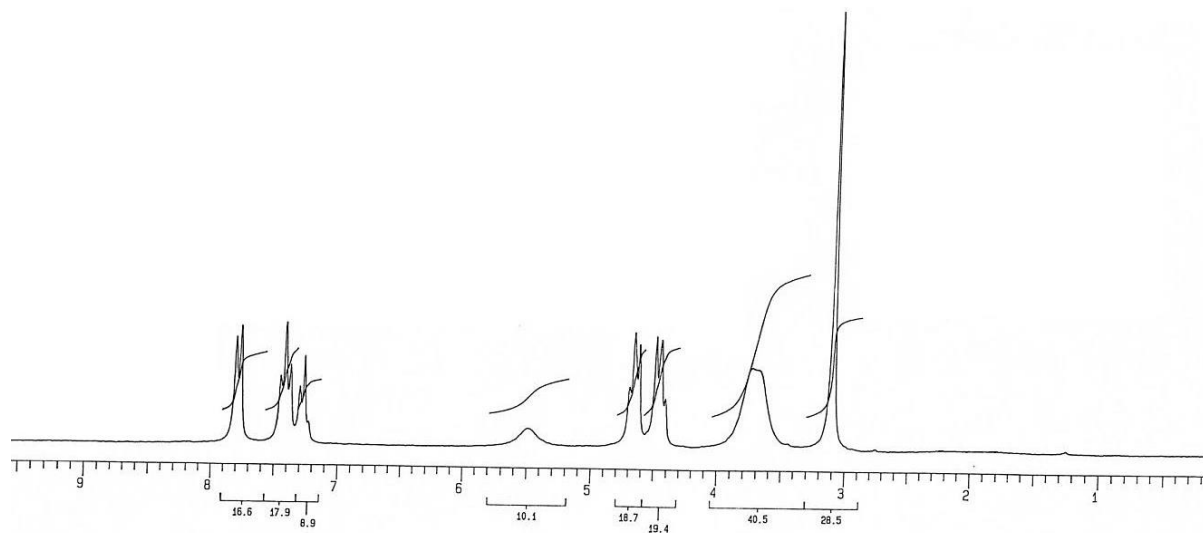
^1H -NMR (DMSO- d_6 , 400 MHz) spectrum of 4-chloro-*N*-(2-(4-chlorophenyl)-7-(4,5-dihydro-1*H*-imidazol-2-yl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzamide (**4e**)



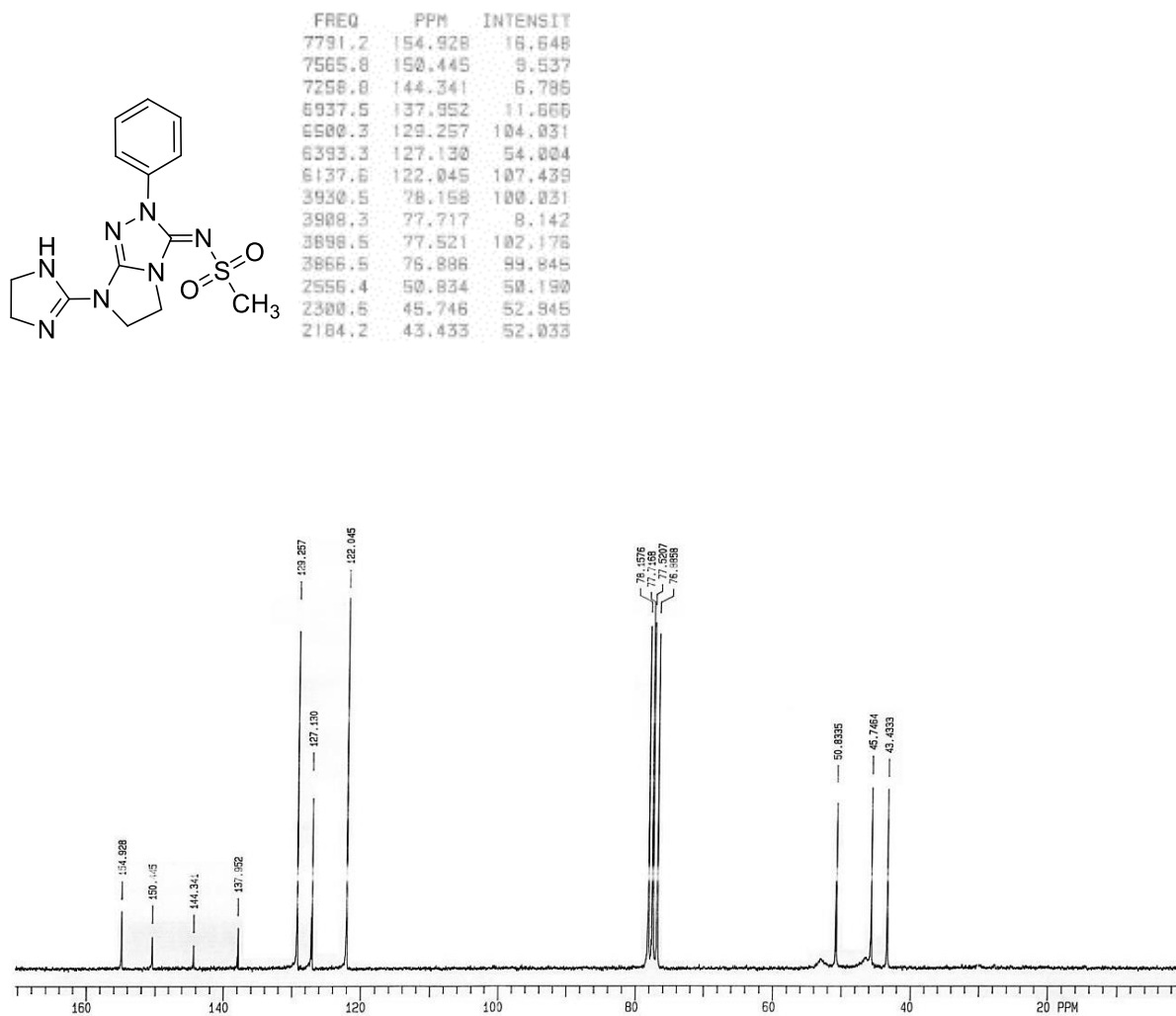
^1H -NMR (CDCl_3 , 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)methanesulfonamide (**5a**)



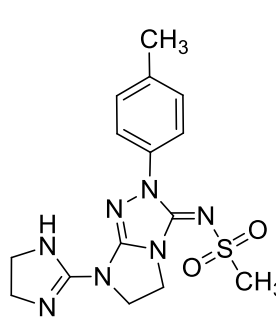
FREQ	PPM	INTENSITY
1560.97	7.906	31.003
1553.27	7.767	34.074
1490.34	7.453	20.033
1483.02	7.416	35.603
1475.13	7.377	23.243
1460.41	7.303	16.917
1453.09	7.266	25.682
1446.37	7.233	6.945
939.45	4.898	18.090
932.62	4.664	33.637
924.37	4.622	30.271
897.92	4.490	32.668
889.80	4.450	31.630
882.97	4.415	14.012
747.59	3.738	23.930
742.38	3.712	23.495
740.16	3.701	23.349
737.84	3.690	23.414
735.91	3.685	23.340
619.93	3.100	124.896

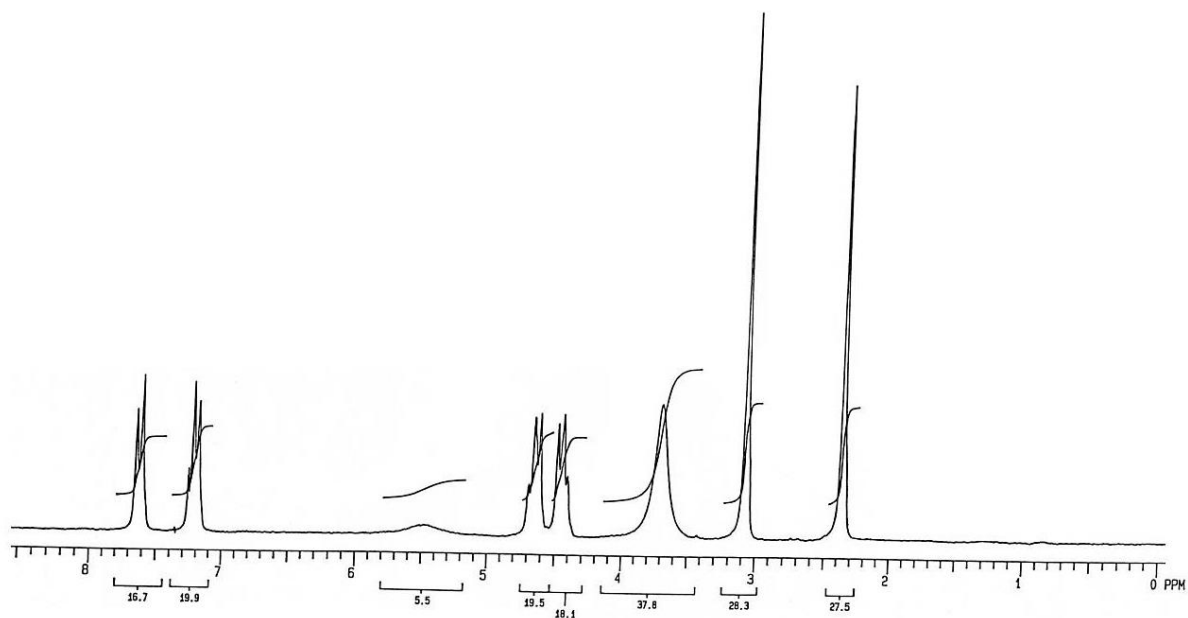


^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)methanesulfonamide (**5a**)

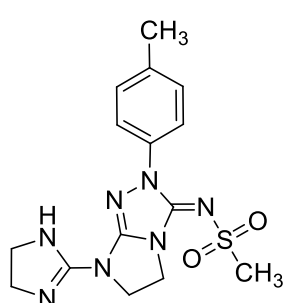


^1H -NMR (CDCl_3 , 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)methanesulfonamide (**5b**)

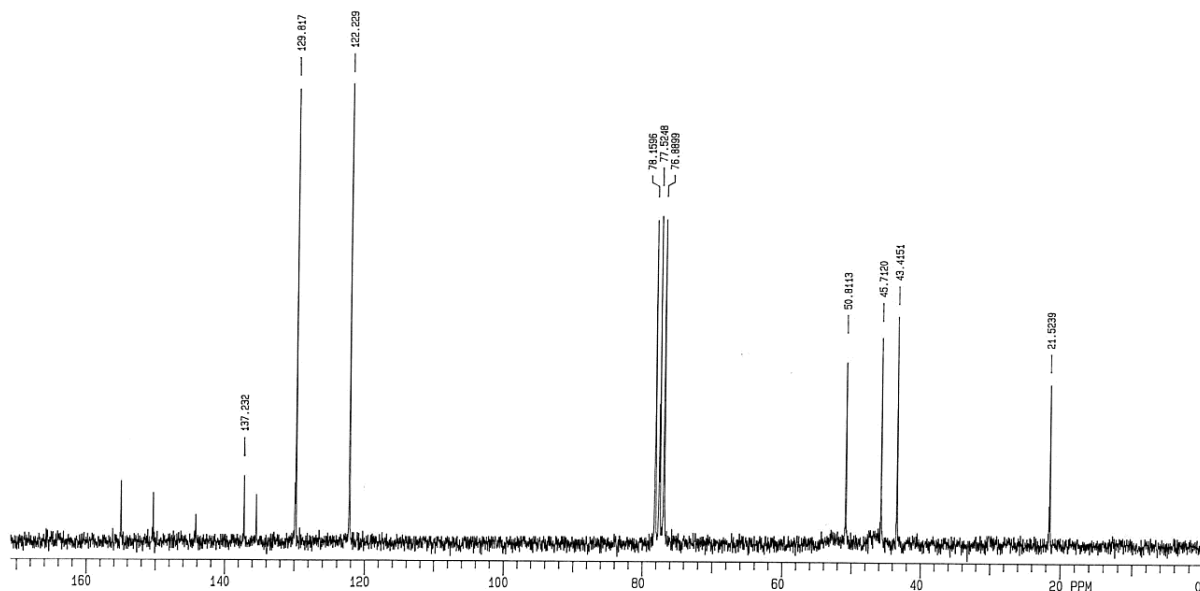
	FRFQ	PPM	INTENSITY
	1530.53	7.654	34.360
	1522.18	7.617	43.967
	1453.77	7.267	17.801
	1446.31	7.237	47.358
	1438.25	7.197	36.897
	938.88	4.695	14.606
	931.97	4.660	33.617
	923.85	4.670	34.748
	897.87	4.490	31.983
	889.70	4.449	34.594
	887.84	4.415	17.003
	740.99	3.705	37.815
	616.69	3.084	148.319
	474.01	2.370	178.705



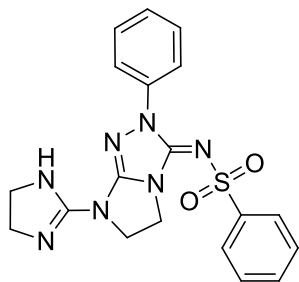
^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)methanesulfonamide (**5b**)



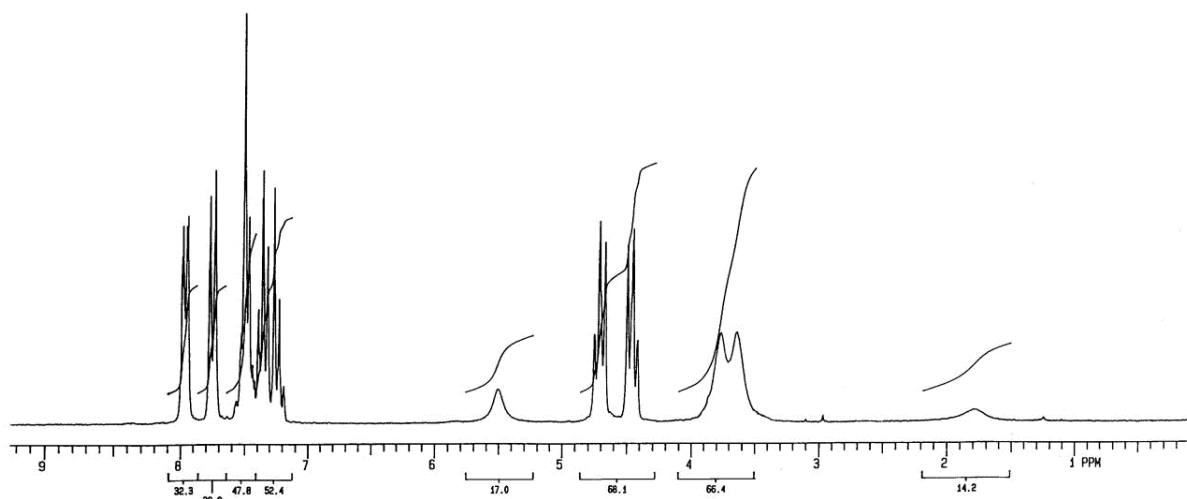
FREQ	PPM	INTENSITY
7793.6	154.974	18.395
7561.4	150.358	13.800
7254.6	144.758	8.117
6901.3	137.737	70.841
6811.7	135.440	13.474
6578.4	129.817	129.337
6146.8	127.779	130.369
3930.6	78.160	95.105
3898.7	77.575	98.330
3866.7	76.890	95.306
2555.3	50.811	56.598
2298.8	45.717	60.056
2183.3	43.415	64.845
1087.4	21.574	45.731



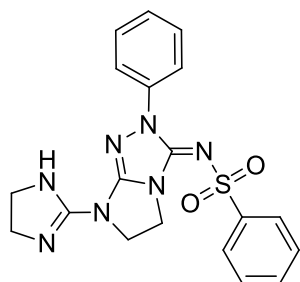
^1H -NMR (CDCl_3 , 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzenesulfonamide (**5c**)



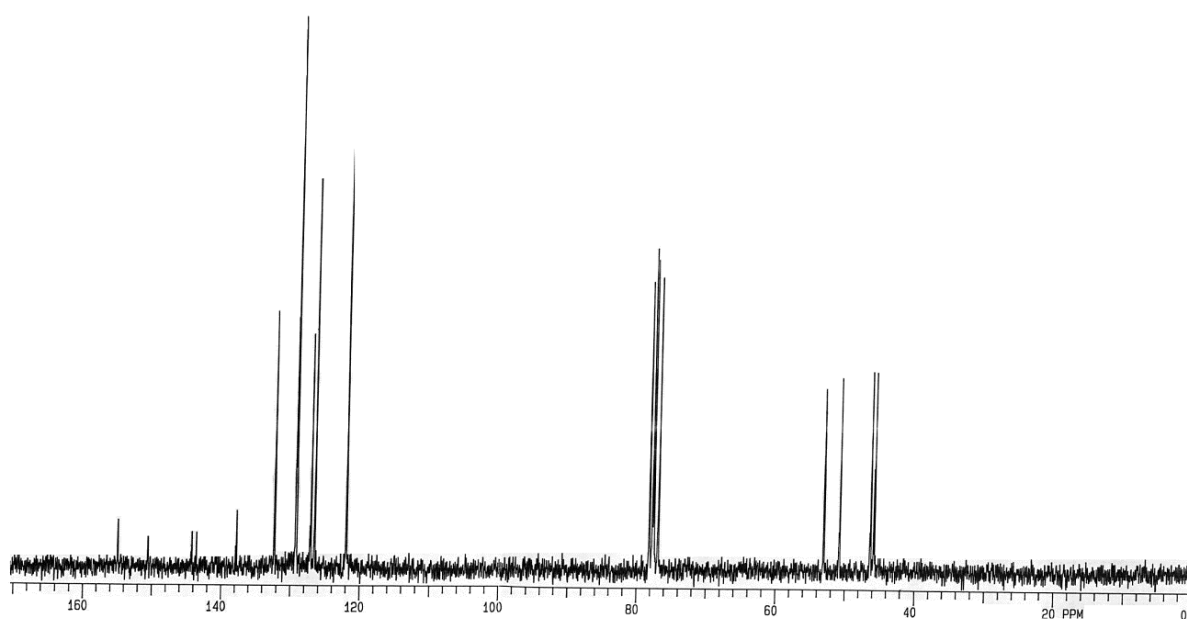
FREQ	PPM	INTENSITY	1476.36	7.383	21.949	891.07	4.456	58.683
1597.46	7.988	50.973	1471.02	7.356	76.325	883.19	4.416	25.605
1595.89	7.980	60.056	1462.95	7.316	53.712	781.16	3.906	6.384
1594.49	7.973	41.931	1452.97	7.266	71.201	753.32	3.767	27.705
1590.09	7.951	59.999	1445.09	7.226	38.039	743.01	3.715	19.152
1588.00	7.941	63.052	1437.66	7.189	12.021	739.06	3.696	19.265
1553.43	7.768	68.848	1101.44	5.508	11.039	728.39	3.642	27.906
1545.54	7.729	76.365	1099.82	5.500	10.923	708.49	3.543	7.367
1513.81	7.570	7.565	1087.52	5.438	4.586	702.74	3.514	4.923
1512.08	7.561	7.650	950.70	4.754	27.424	672.35	3.506	4.593
1505.69	7.529	27.598	949.82	4.750	27.334	520.16	2.601	17.234
1500.48	7.503	122.871	942.81	4.715	61.055	365.08	1.826	4.142
1493.11	7.466	62.657	934.46	4.673	54.751	358.69	1.794	4.616
1487.54	7.439	18.339	925.59	4.629	4.243	355.80	1.779	4.565
1484.29	7.422	13.642	924.76	4.624	4.159	353.58	1.768	4.463
1478.08	7.391	35.066	899.43	4.498	54.130	350.23	1.751	3.964



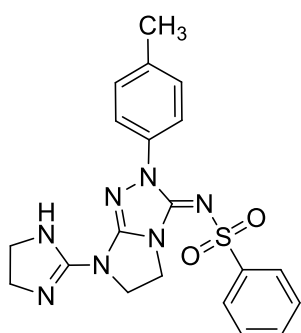
^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzenesulfonamide (**5c**)



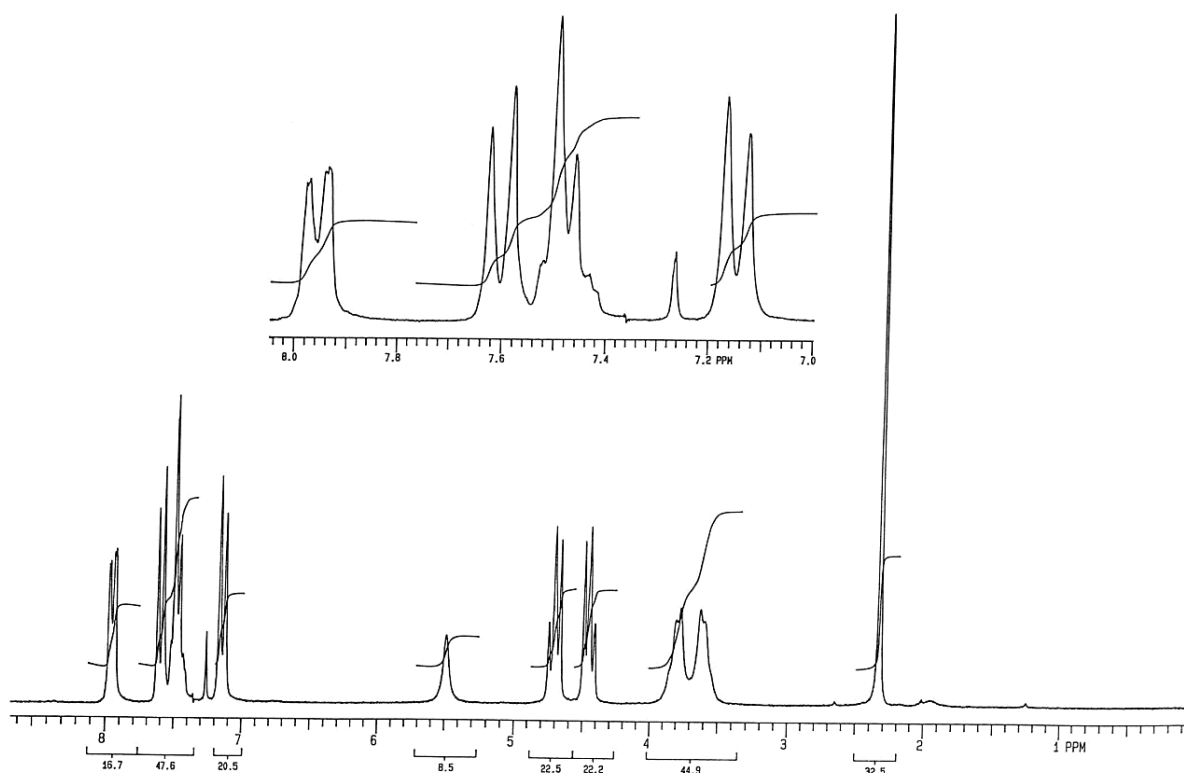
FREQ	PPM	INTENSITY
7790.6	154.915	14.353
7571.2	150.552	9.080
7257.5	144.315	10.259
7224.5	143.655	10.327
6933.6	137.875	16.365
6653.8	132.310	74.102
6500.0	129.251	158.255
6496.0	129.172	125.135
6394.5	127.155	69.514
6366.1	126.588	121.690
6133.9	121.972	142.004
3931.9	78.186	84.586
3926.1	78.071	8.720
3910.1	77.751	93.245
3900.0	77.551	89.950
3868.0	76.914	84.374
2668.0	53.054	54.504
2556.5	50.836	56.739
2333.3	46.397	11.368
2329.6	46.325	57.790
2304.9	45.833	57.871



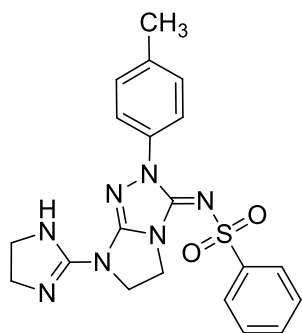
¹H-NMR (CDCl₃, 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzenesulfonamide (**5d**)



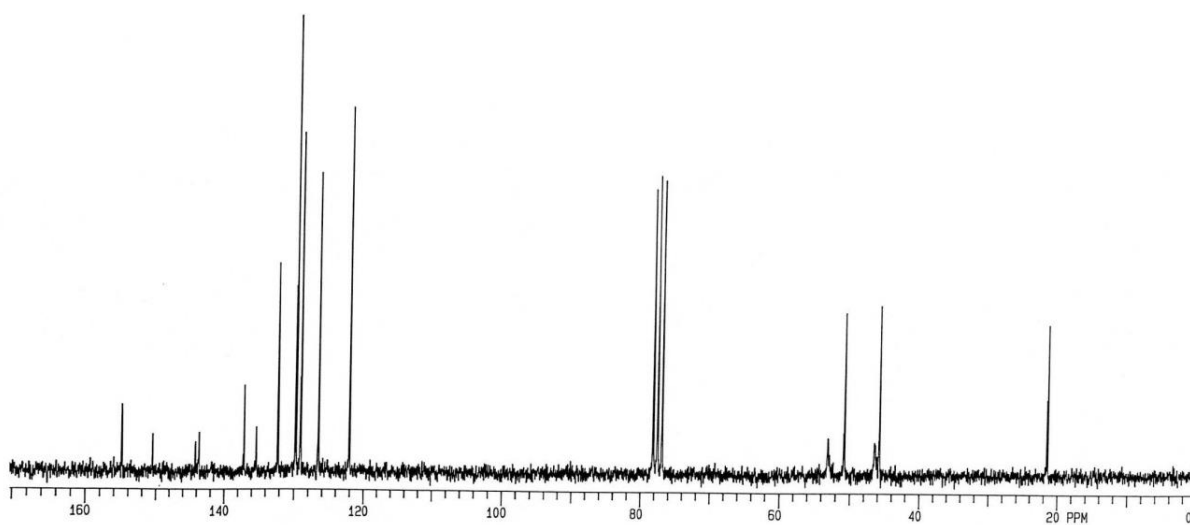
FREQ	PPM	INTENSITY	949.61	4.749	23.066
1594.56	7.974	39.562	942.18	4.711	50.287
1588.81	7.945	41.702	933.60	4.669	46.514
1587.55	7.939	43.014	898.80	4.495	46.096
1524.73	7.625	54.645	890.21	4.452	50.260
1516.38	7.583	66.411	883.02	4.416	22.508
1499.21	7.497	86.682	761.69	3.809	24.123
1492.30	7.462	47.109	754.49	3.773	27.507
1486.86	7.435	12.710	745.45	3.728	8.283
1486.17	7.432	12.974	726.37	3.632	27.032
1483.95	7.421	8.215	722.89	3.615	23.518
1482.92	7.416	7.718	720.80	3.604	23.612
1452.58	7.264	19.368	719.98	3.600	23.700
1433.97	7.171	63.889	712.97	3.565	11.380
1425.67	7.129	53.251	711.34	3.557	9.934
1098.26	5.492	19.034	710.41	3.553	9.249
			466.53	2.333	212.111



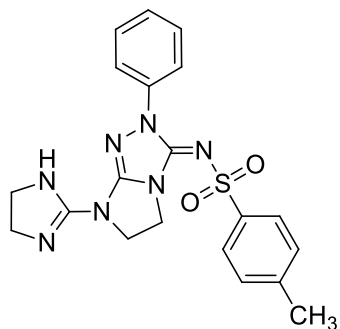
^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzenesulfonamide (**5d**)



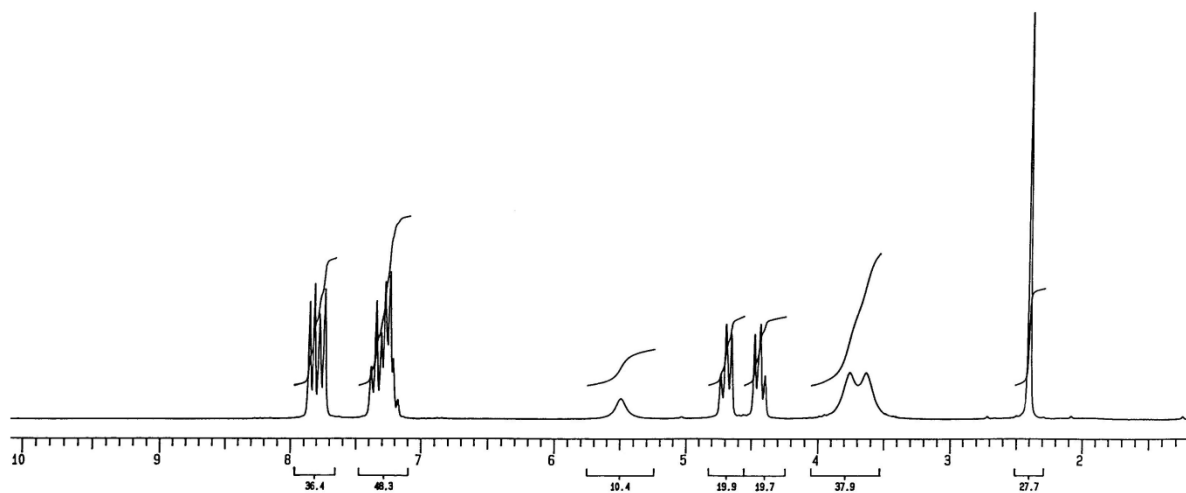
FREQ	PPM	INTENSITY
7790.9	154.821	20.448
7567.6	150.481	11.299
7252.5	144.215	8.796
7229.4	143.756	11.119
6899.9	137.203	24.574
6809.5	135.406	12.954
6649.2	132.219	60.377
6527.4	129.797	130.052
6493.8	129.128	101.538
6366.0	126.586	97.336
6139.1	122.076	110.743
3930.9	78.166	85.102
3899.0	77.531	86.971
3866.9	76.894	84.745
2669.8	53.088	10.867
2556.3	50.832	49.312
2338.8	46.507	8.841
2334.1	46.414	9.516
2303.5	45.805	50.216
1060.6	21.488	43.086



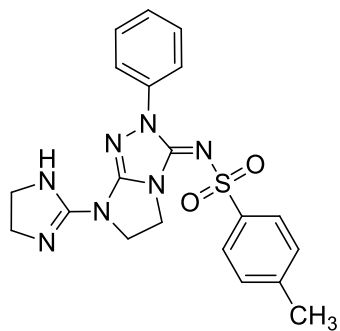
¹H-NMR (CDCl₃, 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-methylbenzenesulfonamide (**5e**)



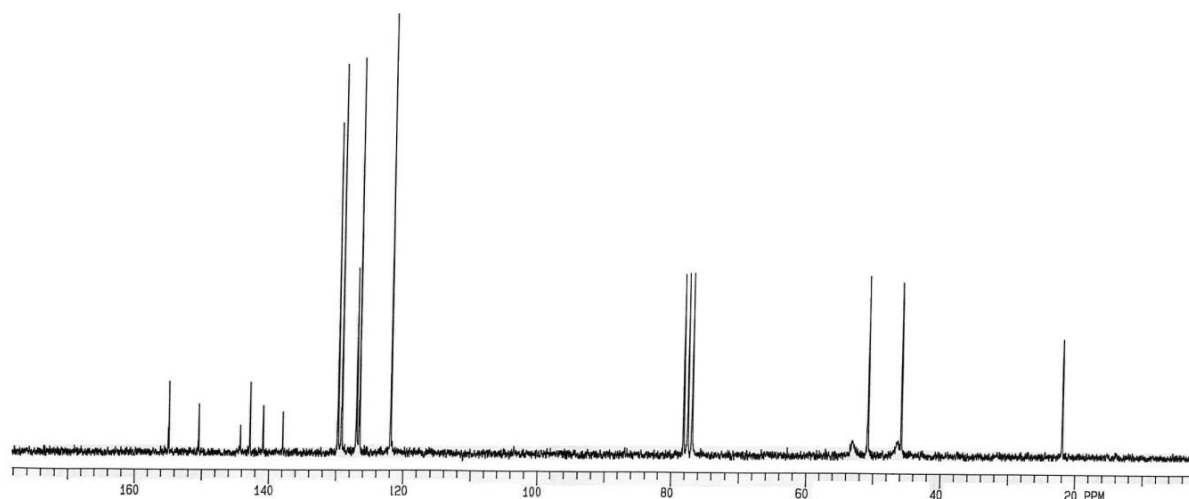
FREQ	PPM	INTENSITY	1435.34	7.178	6.015
1571.99	7.861	34.024	1098.76	5.495	6.307
1563.87	7.820	39.100	946.99	4.736	13.234
1556.03	7.781	30.497	939.56	4.698	27.593
1547.68	7.739	37.649	931.16	4.656	24.674
1477.57	7.389	15.376	895.48	4.478	24.703
1469.86	7.350	34.279	887.08	4.436	27.620
1461.97	7.311	25.117	879.71	4.399	12.822
1456.27	7.282	39.650	751.69	3.759	13.830
1448.57	7.244	42.529	727.23	3.637	13.702
1443.00	7.216	17.641	480.44	2.402	116.045



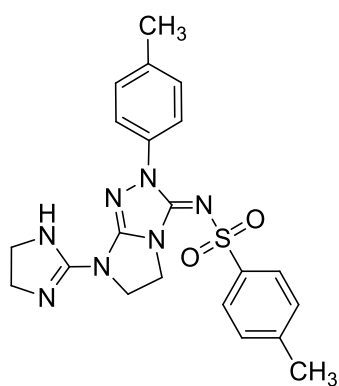
^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-methylbenzenesulfonamide (**5e**)



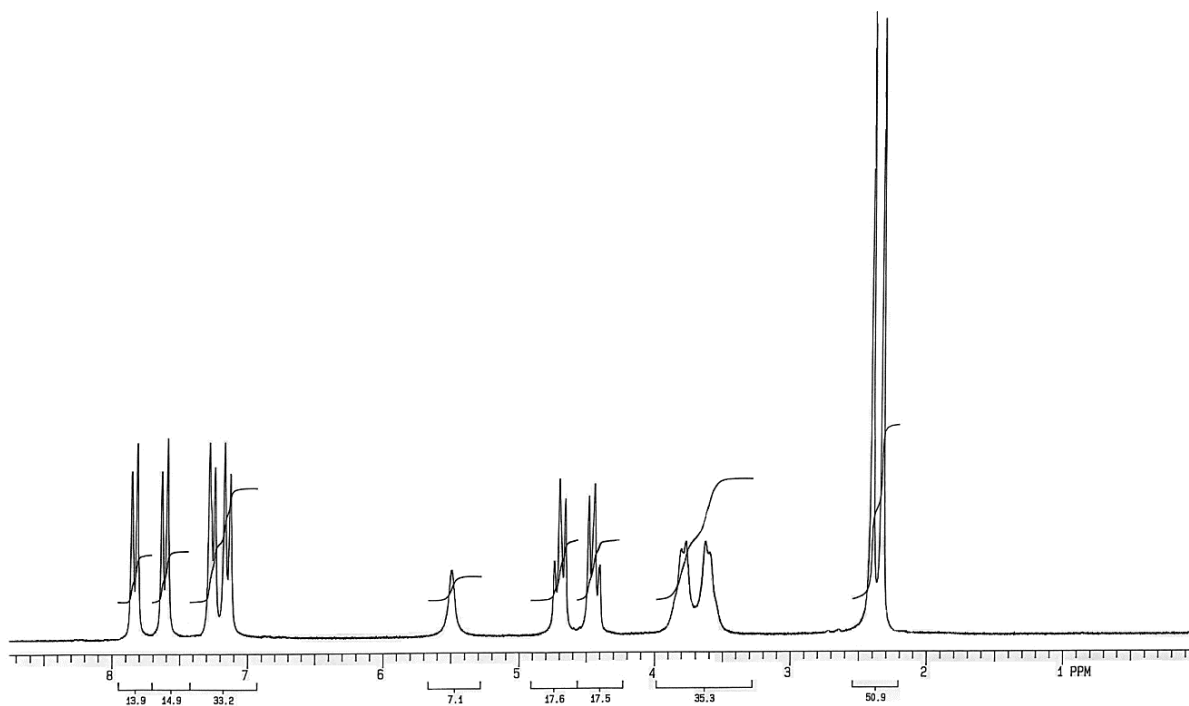
FREQ	PPM	INTENSIT'	6387.6	127.017	56.356
7790.1	154.905	21.417	6367.2	126.611	117.976
7569.8	150.524	14.129	6129.3	121.881	130.052
7256.4	144.292	8.866	3931.6	78.180	55.269
7183.6	142.845	20.560	3899.6	77.543	55.958
7085.5	140.895	13.908	3867.6	76.906	56.492
6937.8	137.958	13.523	2555.9	50.823	53.245
6525.3	129.755	103.884	2305.7	45.850	52.958
6498.3	129.219	117.942	1104.7	21.967	36.959



^1H -NMR (CDCl_3 , 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-methylbenzenesulfonamide (**5f**)

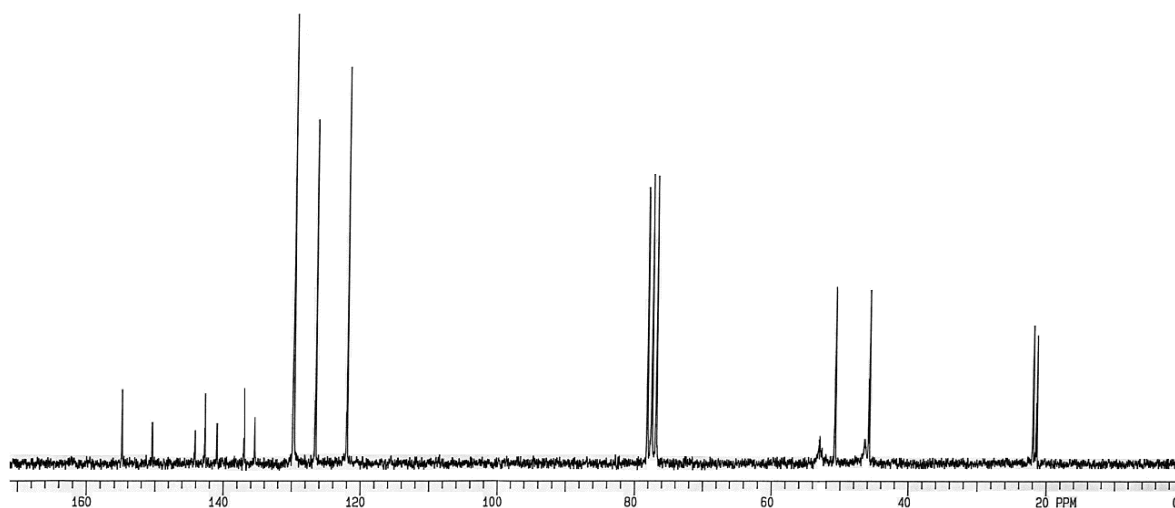


FREQ	PPM	INTENSITY	880.93	4.405	20.143
1571.31	7.858	48.597	760.58	3.803	24.923
1563.19	7.817	56.598	758.49	3.793	23.885
1526.87	7.635	48.467	754.31	3.772	27.119
1518.47	7.593	58.030	745.63	3.729	9.414
1456.01	7.281	56.770	744.23	3.722	8.732
1453.33	7.268	37.703	737.97	3.690	8.372
1447.94	7.241	49.403	726.14	3.631	27.076
1433.79	7.170	56.674	723.17	3.616	24.133
1425.43	7.128	47.471	719.75	3.599	23.880
1098.96	5.495	19.009	711.34	3.557	10.672
947.52	4.738	21.388	710.36	3.552	9.835
940.27	4.702	45.608	709.20	3.546	9.020
931.69	4.659	39.679	708.09	3.541	8.004
896.71	4.484	40.517	706.93	3.535	6.868
888.18	4.441	44.063	480.97	2.405	182.186
			466.17	2.331	179.284

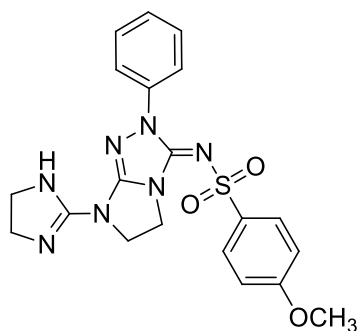


^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-methylbenzenesulfonamide (**5f**)

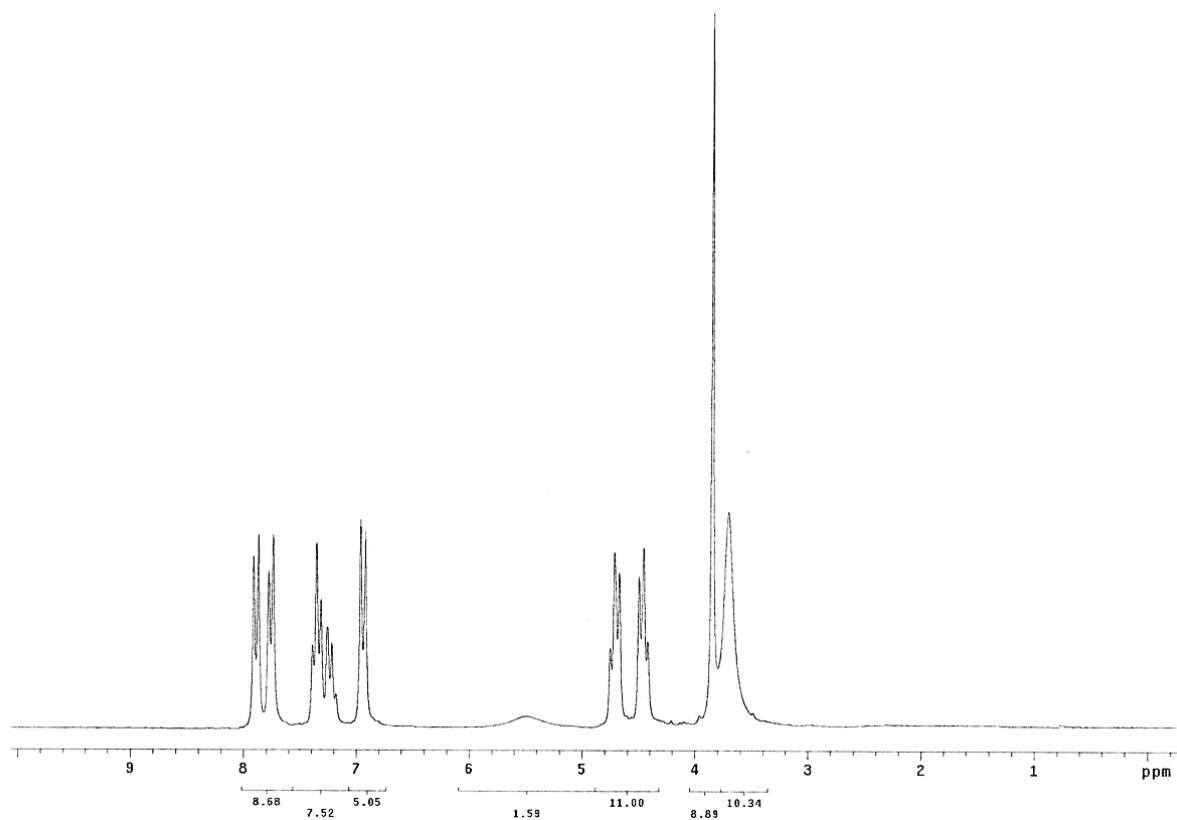
	FREQ	PPM	INTENSITY
	7792.1	154.946	21.280
	7565.9	150.447	12.098
	7251.5	144.195	9.483
	7179.0	142.754	20.037
	7089.5	140.974	11.584
	6893.5	137.076	21.592
	6812.9	135.475	13.287
	6526.3	129.775	129.912
	6523.8	129.724	130.052
	6367.1	126.609	102.678
	6135.7	122.009	114.628
	3930.8	78.164	83.222
	3898.9	77.529	86.629
	3866.9	76.894	85.168
	2555.6	50.817	51.797
	2333.2	46.395	6.842
	2304.3	45.821	51.142
	1104.5	21.963	40.013
	1080.3	21.481	39.009



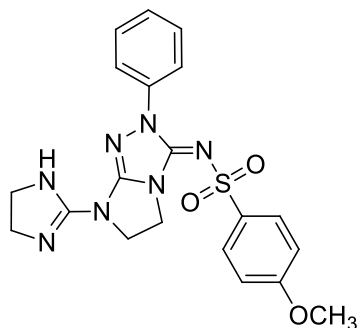
^1H -NMR (CDCl_3 , 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-methoxybenzenesulfonamide(**5g**)



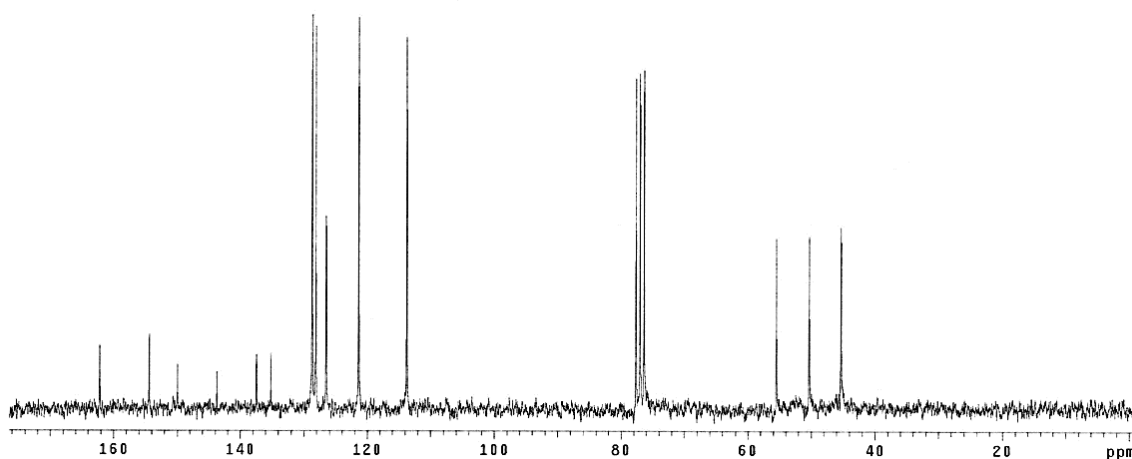
FREQUENCY	PPM	HEIGHT
1582.434	7.914	34.4
1574.230	7.873	38.1
1555.516	7.779	32.9
1547.825	7.741	39.6
1478.352	7.393	18.4
1471.174	7.357	38.4
1463.740	7.320	26.5
1451.947	7.261	21.8
1444.513	7.224	17.2
1437.335	7.188	7.0
1393.241	6.967	42.2
1385.038	6.926	39.7
958.511	4.753	18.1
943.076	4.716	38.6
935.129	4.676	32.7
899.752	4.500	32.4
891.805	4.460	33.2
884.627	4.424	13.0
779.804	3.855	137.4
742.604	3.714	39.5
250.909	1.255	5.0



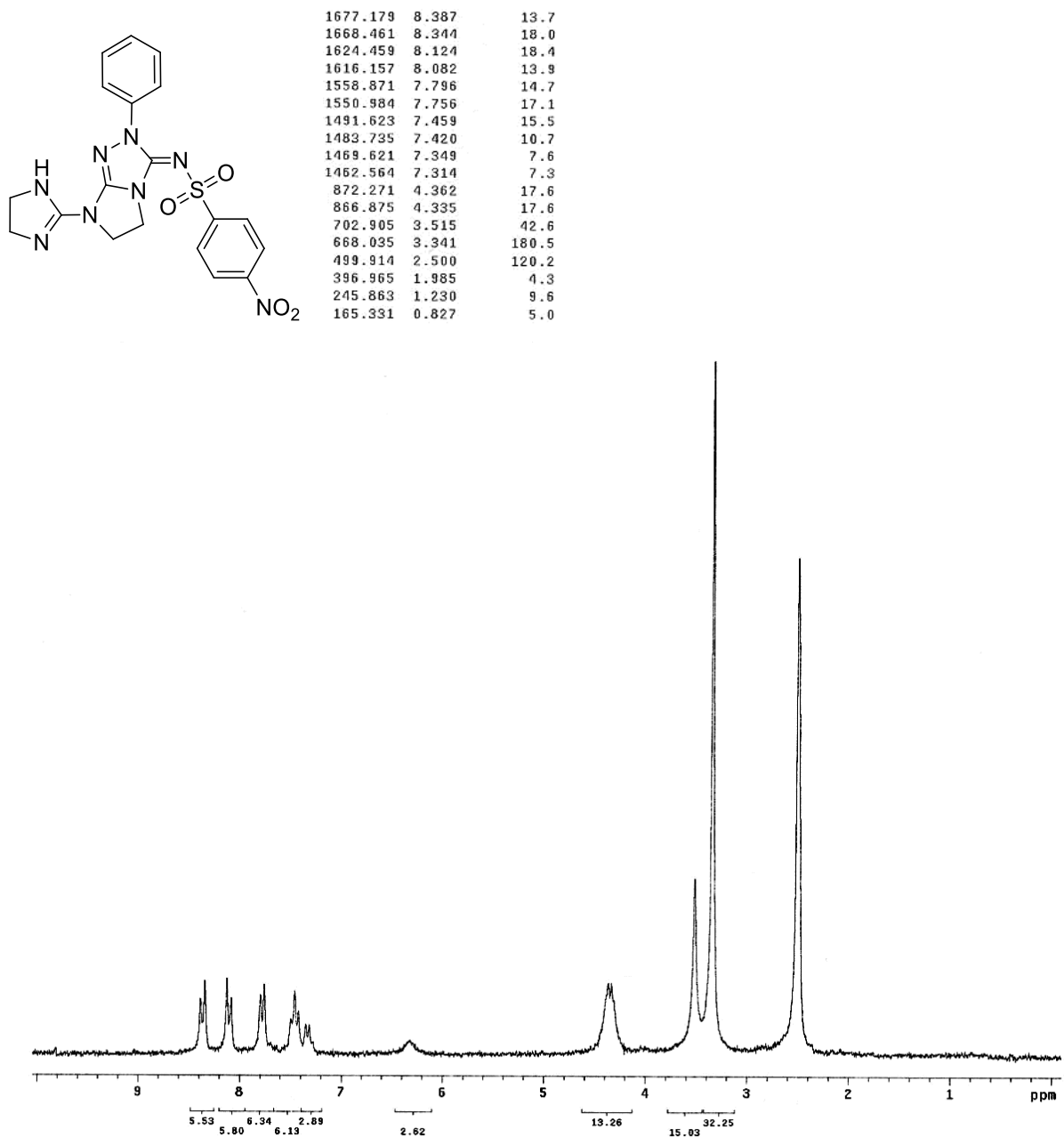
^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-methoxybenzenesulfonamide (**5g**)



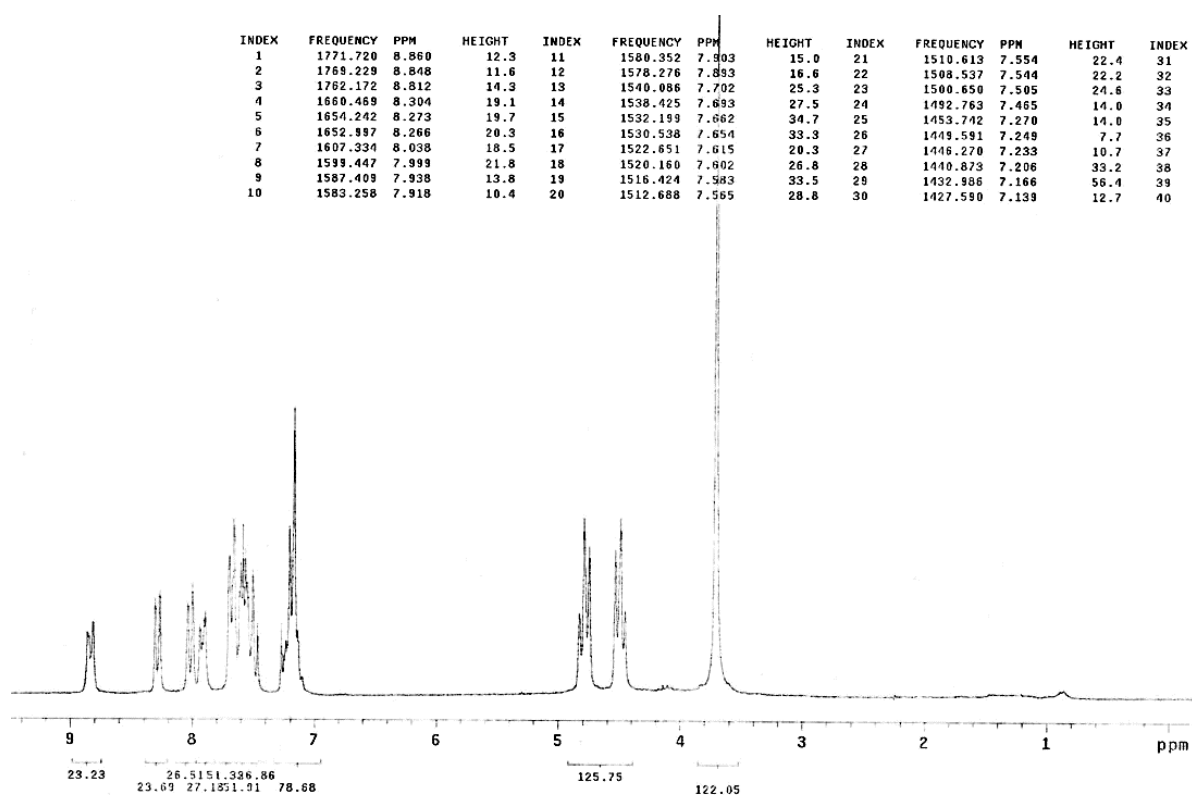
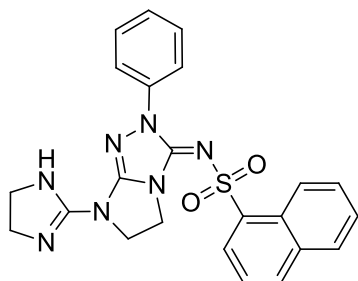
FREQUENCY	PPM	HEIGHT
8152.935	162.147	13.5
7762.124	154.375	16.2
7539.736	149.952	9.3
7225.521	143.702	7.7
6909.564	137.419	11.5
6786.412	135.168	11.9
6471.316	128.703	84.4
6441.723	128.114	81.8
6359.905	126.487	41.3
6100.524	121.328	83.9
5719.723	113.755	79.5
3904.062	77.645	70.6
3871.857	77.004	71.7
3840.088	76.372	72.4
2790.817	55.504	36.5
2530.131	50.320	39.7
2279.455	45.334	38.8



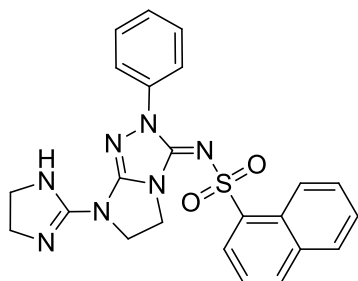
^1H -NMR (DMSO- d_6 , 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-nitrobenzenesulfonamide (**5h**)



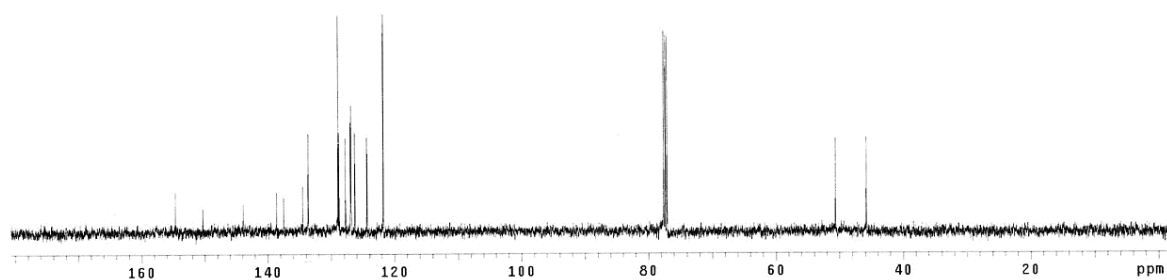
^1H -NMR (CDCl_3 , 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)naphthalene-1-sulfonamide(**5i**)



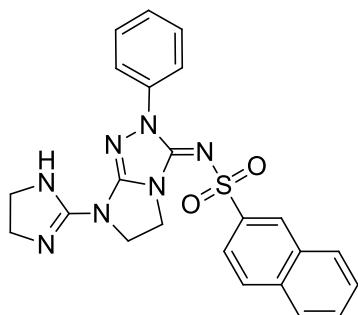
^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)naphthalene-1-sulfonamide (**5i**)



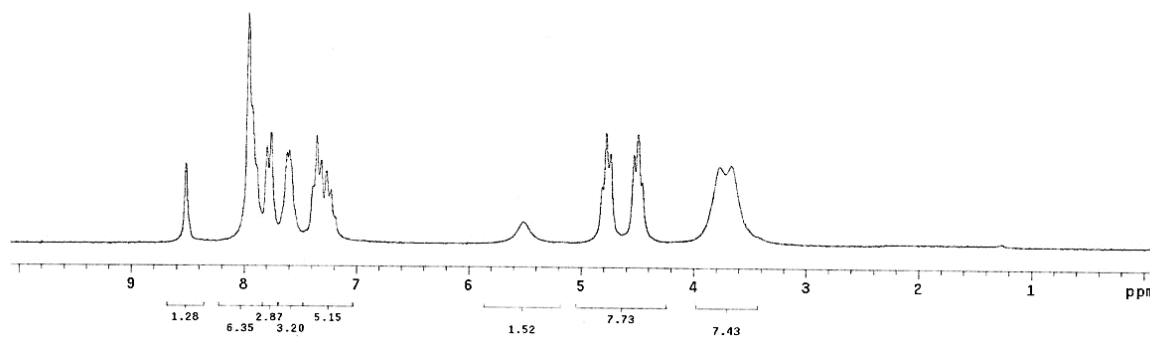
INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	19434.547	154.639	0.2	11	16048.142	127.693	0.4	21	5754.999	45.792	0.4
2	18888.296	150.292	0.1	12	15951.538	126.925	0.4				
3	18082.093	143.877	0.1	13	15941.878	126.848	0.5				
4	17413.770	138.559	0.2	14	15864.156	126.229	0.4				
5	17273.255	137.441	0.1	15	15622.207	124.304	0.4				
6	16900.891	134.479	0.2	16	15299.023	121.733	0.9				
7	16793.309	133.623	0.4	17	9746.056	77.548	0.8				
8	16198.756	128.892	0.9	18	9714.001	77.293	0.8				
9	16186.022	128.790	0.4	19	9681.946	77.038	0.8				
10	16172.410	128.682	0.1	20	6362.725	50.628	0.4				



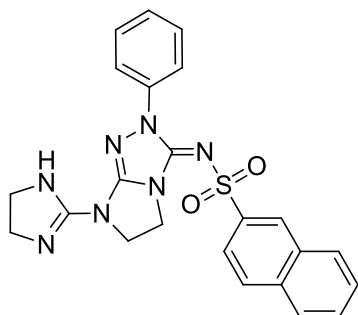
¹H-NMR (CDCl₃, 200 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)naphthalene-2-sulfonamide (**5j**)



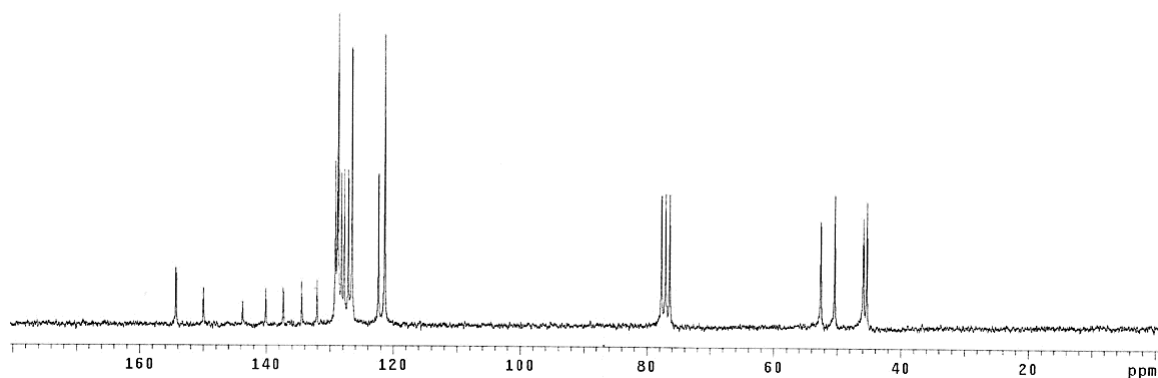
INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	1702.811	8.516	17.1	11	1103.800	5.520	4.8
2	1591.975	7.961	49.3	12	962.661	4.814	12.6
3	1558.766	7.795	20.9	13	955.604	4.779	24.1
4	1551.294	7.758	23.7	14	947.717	4.739	19.6
5	1523.066	7.617	19.5	15	906.621	4.534	19.4
6	1518.915	7.596	20.0	16	898.734	4.494	23.8
7	1470.346	7.353	23.2	17	891.677	4.459	13.4
8	1462.874	7.316	17.9	18	754.689	3.774	16.9
9	1452.912	7.266	15.6	19	733.103	3.666	17.2
10	1445.440	7.228	11.6	20			



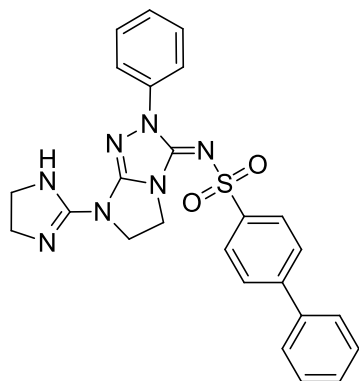
^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)naphthalene-2-sulfonamide (**5j**)



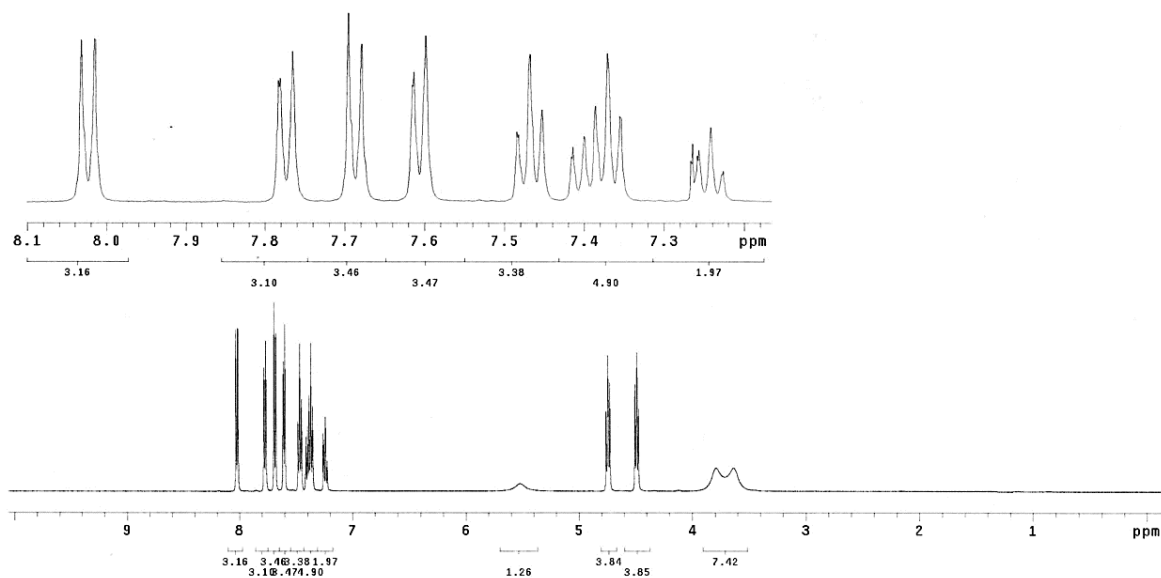
INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	7759.302	154.318	11.7	11	6446.299	128.205	32.0	21	2531.225	50.341	27.9
2	7542.571	150.008	7.4	12	6423.668	127.755	32.7	22	2306.661	45.875	23.0
3	7227.050	143.733	4.4	13	6391.463	127.115	32.7	23	2278.373	45.313	26.3
4	7043.395	140.080	7.3	14	6363.610	126.561	58.6				
5	6905.871	137.345	7.5	15	6151.232	122.337	31.9				
6	6759.644	134.437	8.8	16	6102.489	121.367	61.5				
7	6639.093	132.039	9.0	17	3905.592	77.675	27.6				
8	6495.041	129.175	31.5	18	3873.822	77.043	28.0				
9	6482.420	128.924	37.5	19	3841.617	76.403	27.8				
10	6471.540	128.707	65.8	20	2641.767	52.540	22.2				



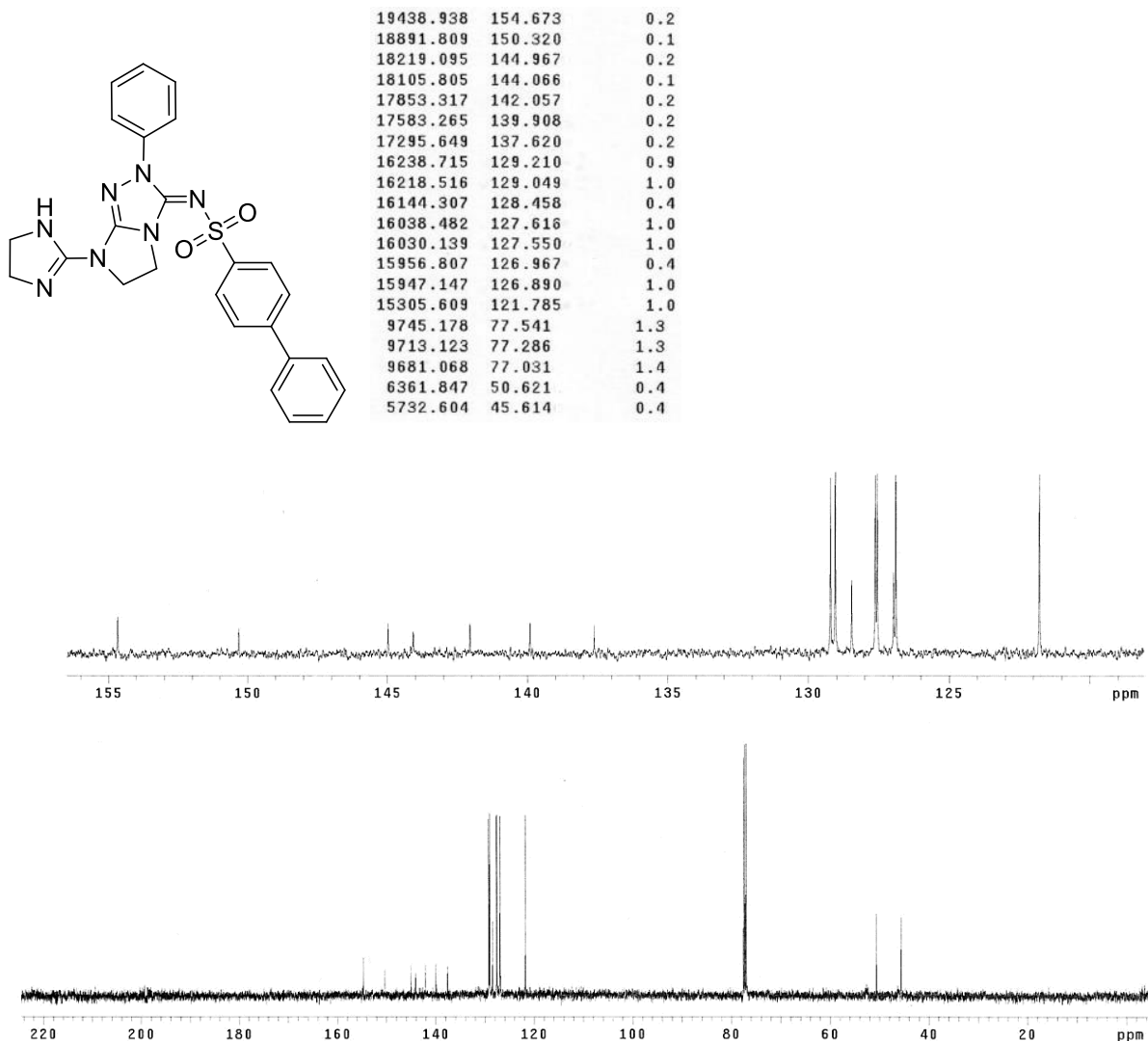
¹H-NMR (CDCl₃, 500 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-[1,1'-biphenyl]-4-sulfonamide (**5k**)



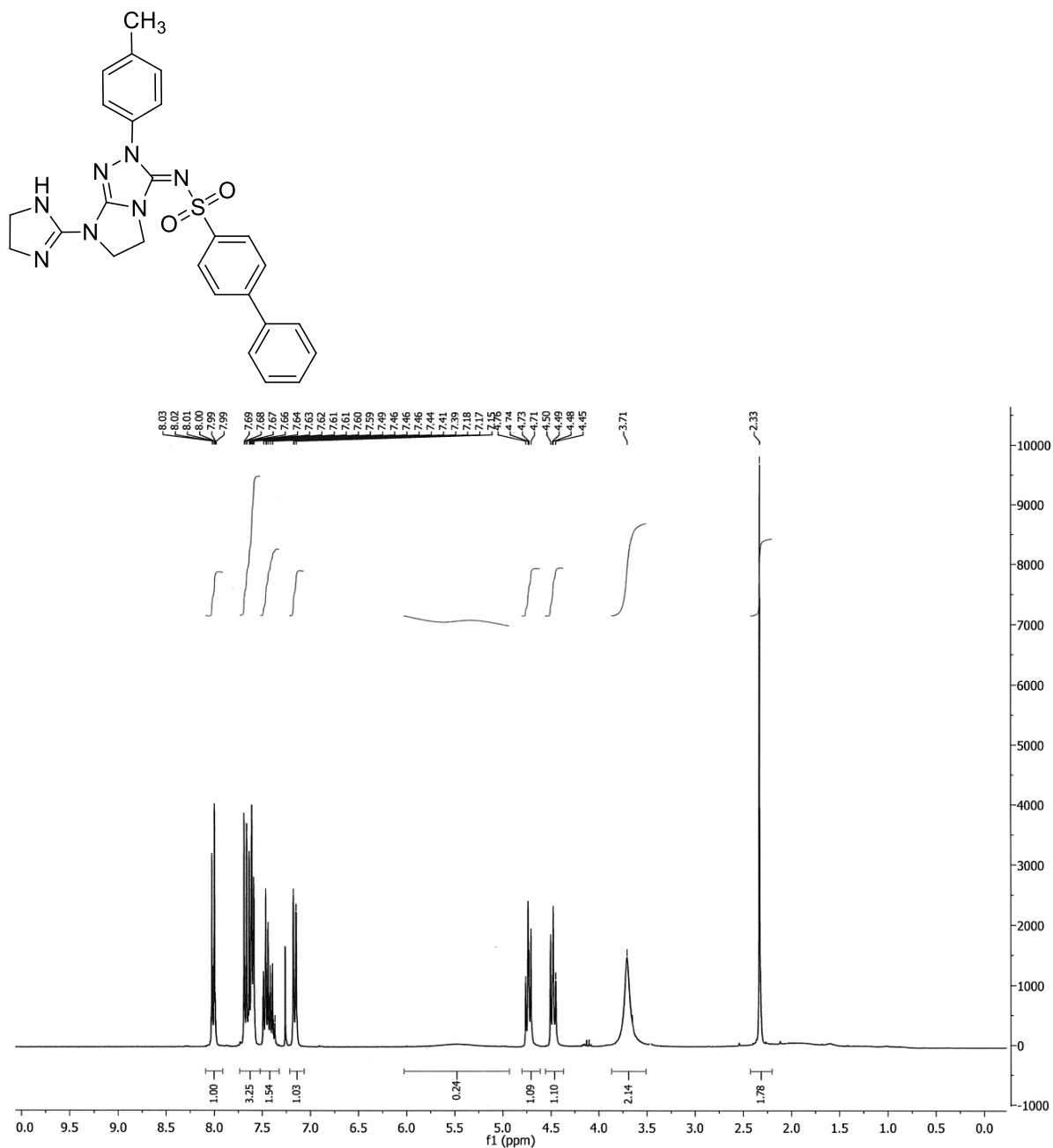
FREQUENCY	PPM	HEIGHT	3691.336	7.385	10.2
4014.597	8.032	17.7	3684.011	7.371	15.9
4005.808	8.015	17.6	3675.710	7.354	9.1
3890.078	7.783	12.9	3631.762	7.266	3.8
3889.102	7.781	13.5	3630.785	7.264	5.7
3881.289	7.766	16.0	3627.855	7.258	4.7
3846.130	7.695	20.6	3626.878	7.257	5.4
3837.829	7.679	17.0	3619.554	7.242	7.9
3805.112	7.613	14.1	3611.741	7.226	3.1
3797.787	7.598	17.6	2758.173	5.518	0.8
3740.655	7.484	7.5	2378.755	4.759	8.9
3739.678	7.482	7.2	2370.942	4.744	14.9
3732.842	7.469	15.6	2362.153	4.726	11.9
3725.029	7.453	9.9	2250.818	4.503	11.7
3706.473	7.416	4.7	2242.517	4.487	15.2
3705.497	7.414	5.6	2234.704	4.471	9.0
3698.660	7.400	6.9	1895.816	3.793	2.5
			1817.198	3.636	2.5



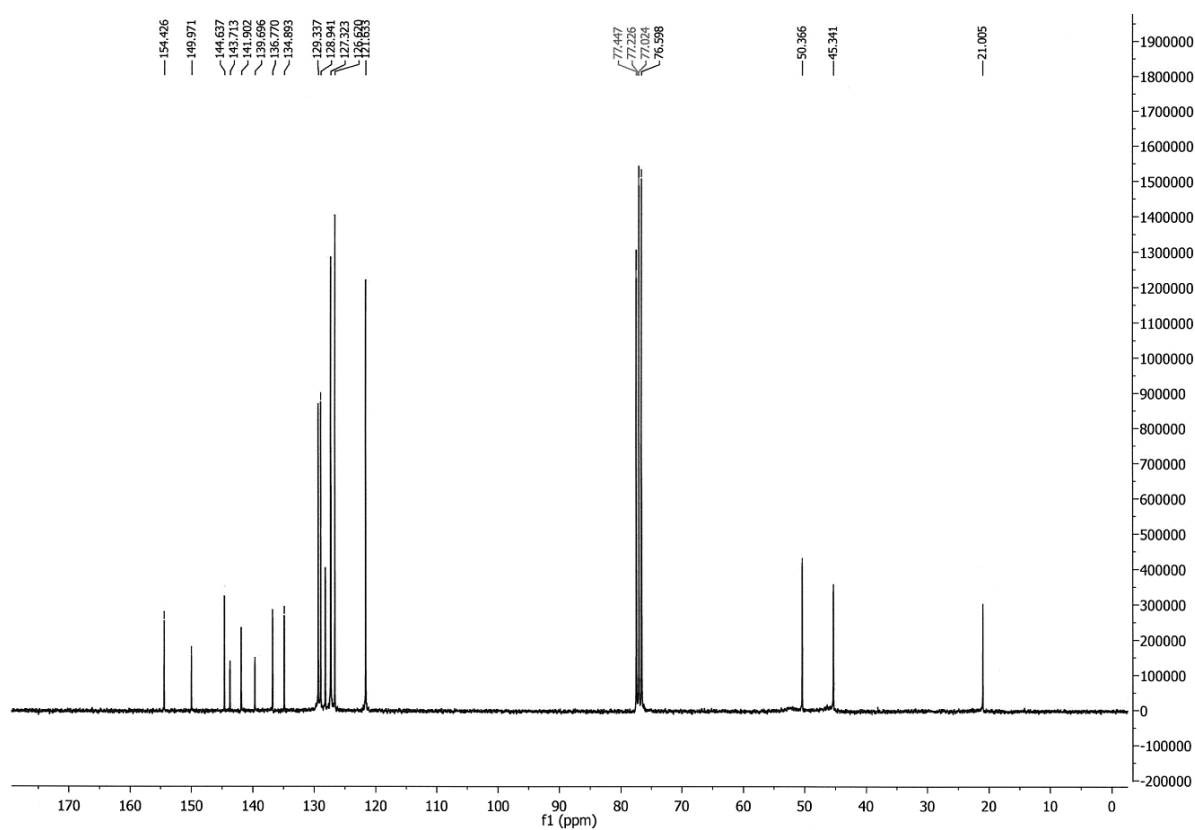
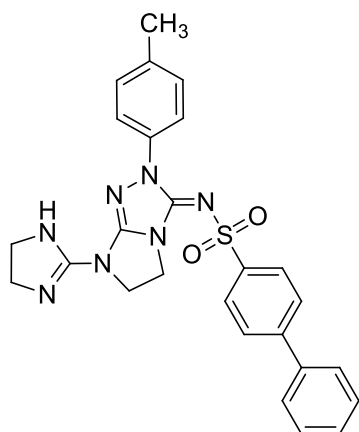
^{13}C -NMR (CDCl_3 , 125 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-[1,1'-biphenyl]-4-sulfonamide (**5k**)



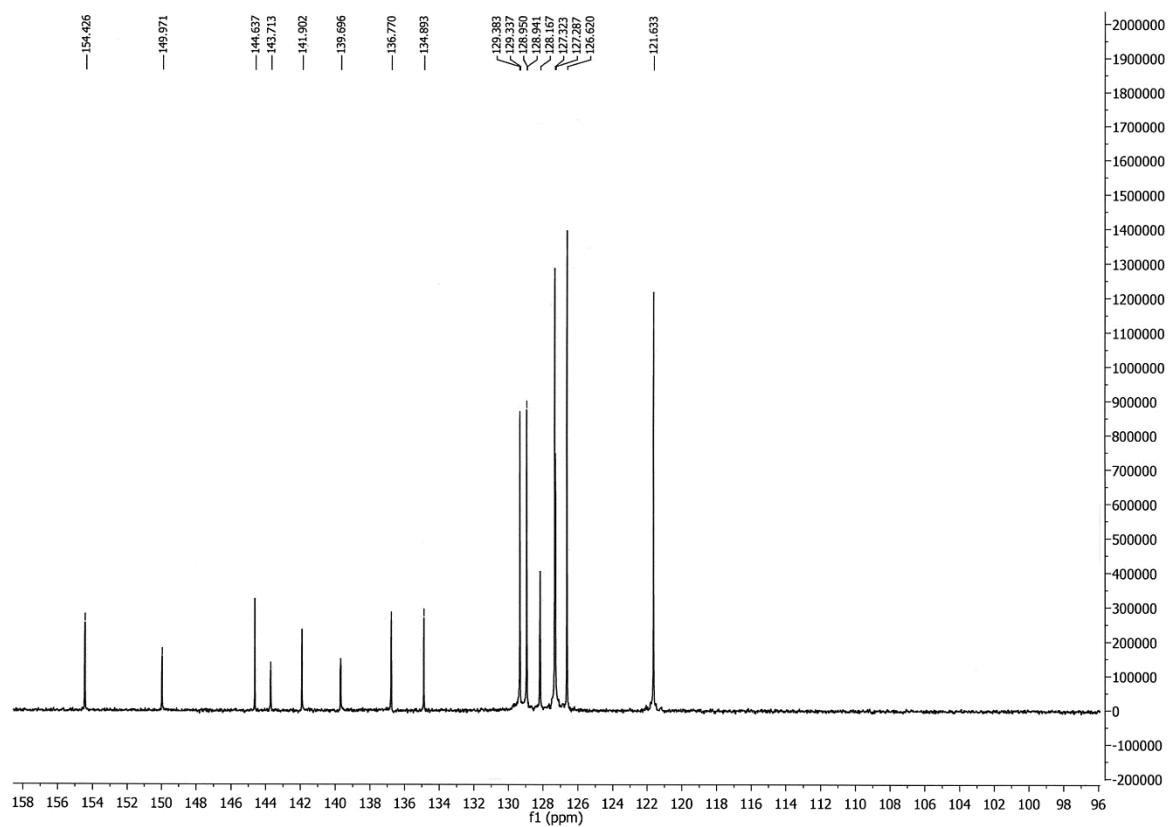
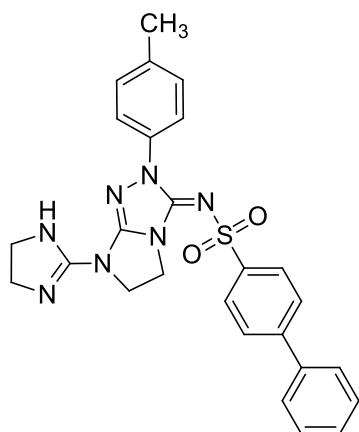
^1H -NMR (CDCl_3 , 300 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-[1,1'-biphenyl]-4-sulfonamide (**51**)



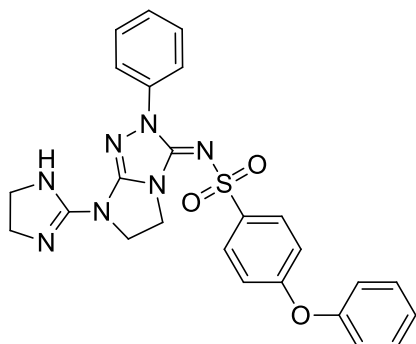
^{13}C -NMR (CDCl_3 , 75 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-[1,1'-biphenyl]-4-sulfonamide (**51**)



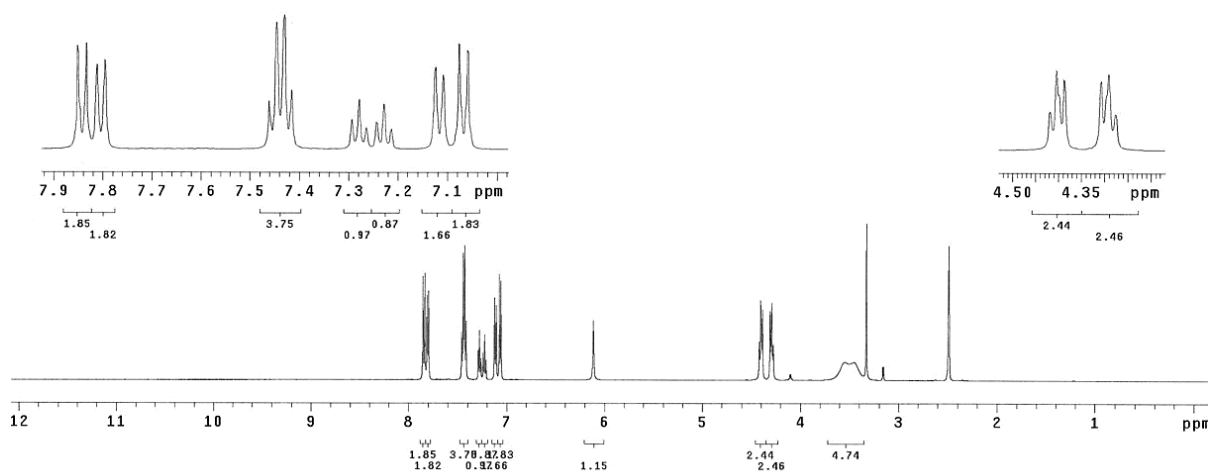
^{13}C -NMR (CDCl_3 , 75 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-[1,1'-biphenyl]-4-sulfonamide (**51**) - (aromatic region)



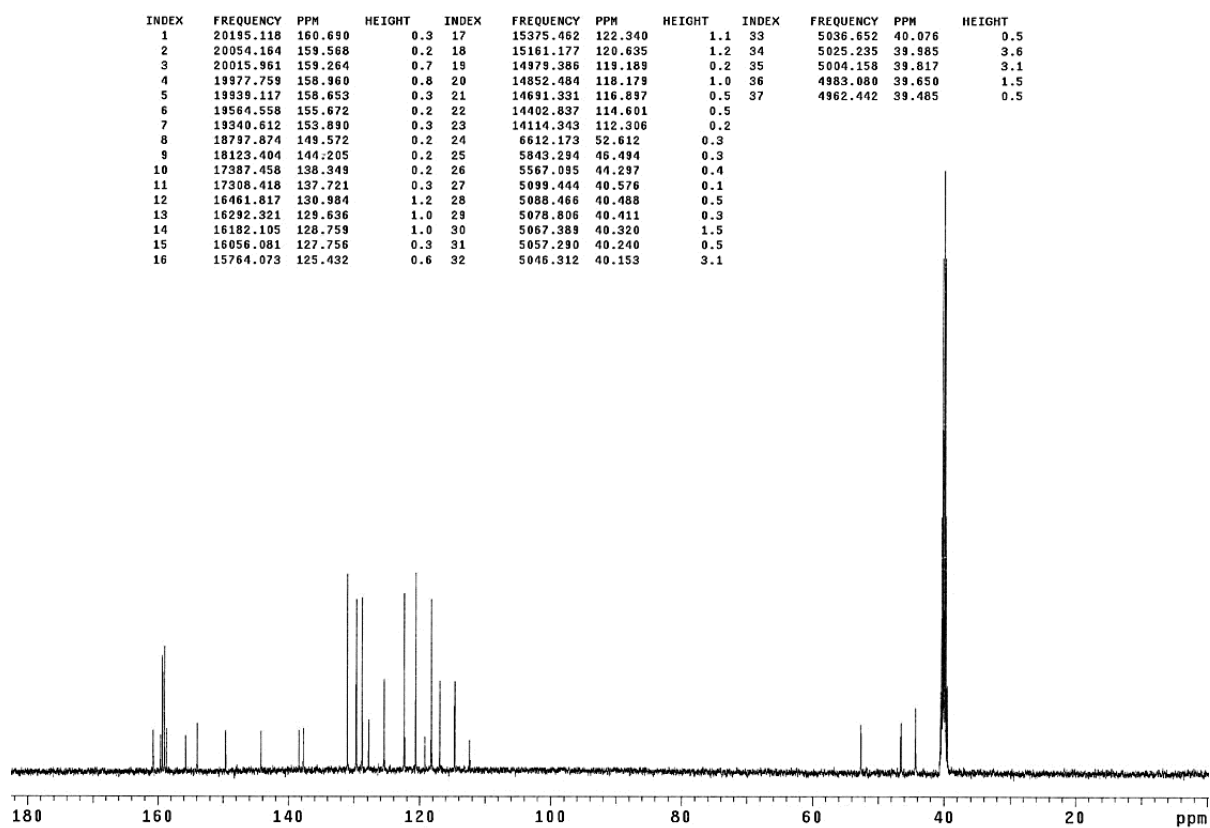
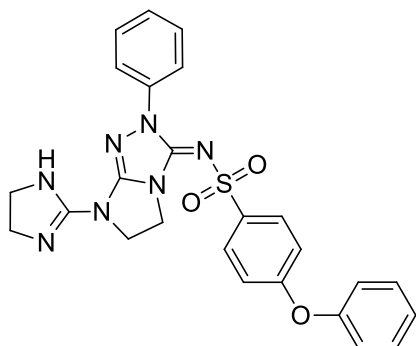
^1H -NMR (DMSO- d_6 , 500 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-phenoxybenzenesulfonamide (**5m**)



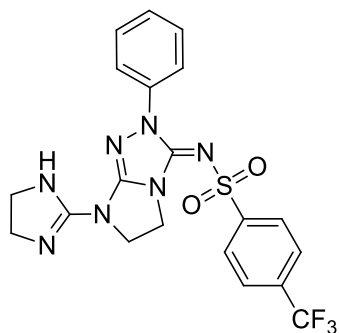
INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	3924.269	7.851	11.0	17	3537.039	7.077	11.2	33	1575.005	3.151	1.4
2	3915.480	7.834	11.4	18	3528.249	7.059	10.5	34	1243.442	2.488	14.3
3	3904.249	7.811	9.0	19	3055.564	6.113	6.3				
4	3896.436	7.796	9.5	20	2208.344	4.418	4.1				
5	3728.945	7.461	5.1	21	2201.020	4.404	8.5				
6	3721.620	7.446	13.5	22	2198.578	4.399	5.9				
7	3713.807	7.430	14.3	23	2192.718	4.387	7.5				
8	3706.483	7.416	6.3	24	2152.677	4.307	7.3				
9	3644.955	7.293	3.2	25	2144.375	4.290	8.2				
10	3637.631	7.278	5.3	26	2137.051	4.276	3.8				
11	3630.306	7.263	2.3	27	2051.596	4.105	0.6				
12	3620.051	7.243	2.9	28	2046.225	4.094	0.7				
13	3612.727	7.228	4.8	29	1772.292	3.546	1.9				
14	3604.914	7.213	2.1	30	1726.870	3.455	1.9				
15	3560.478	7.124	8.7	31	1663.389	3.328	16.7				
16	3552.665	7.108	7.9	32	1580.376	3.162	1.5				



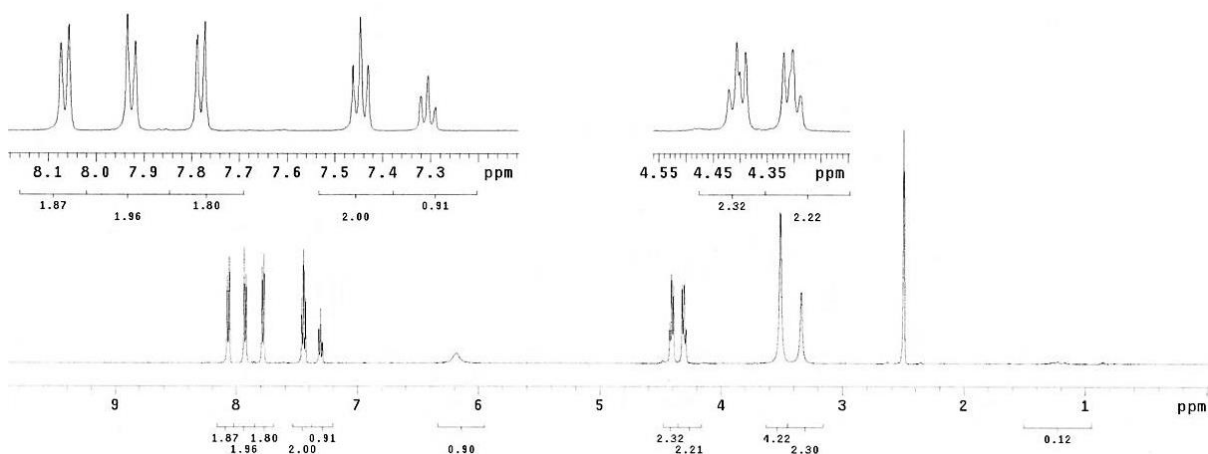
^{13}C -NMR (DMSO- d_6 +TFA, 125 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-phenoxybenzenesulfonamide (**5m**)



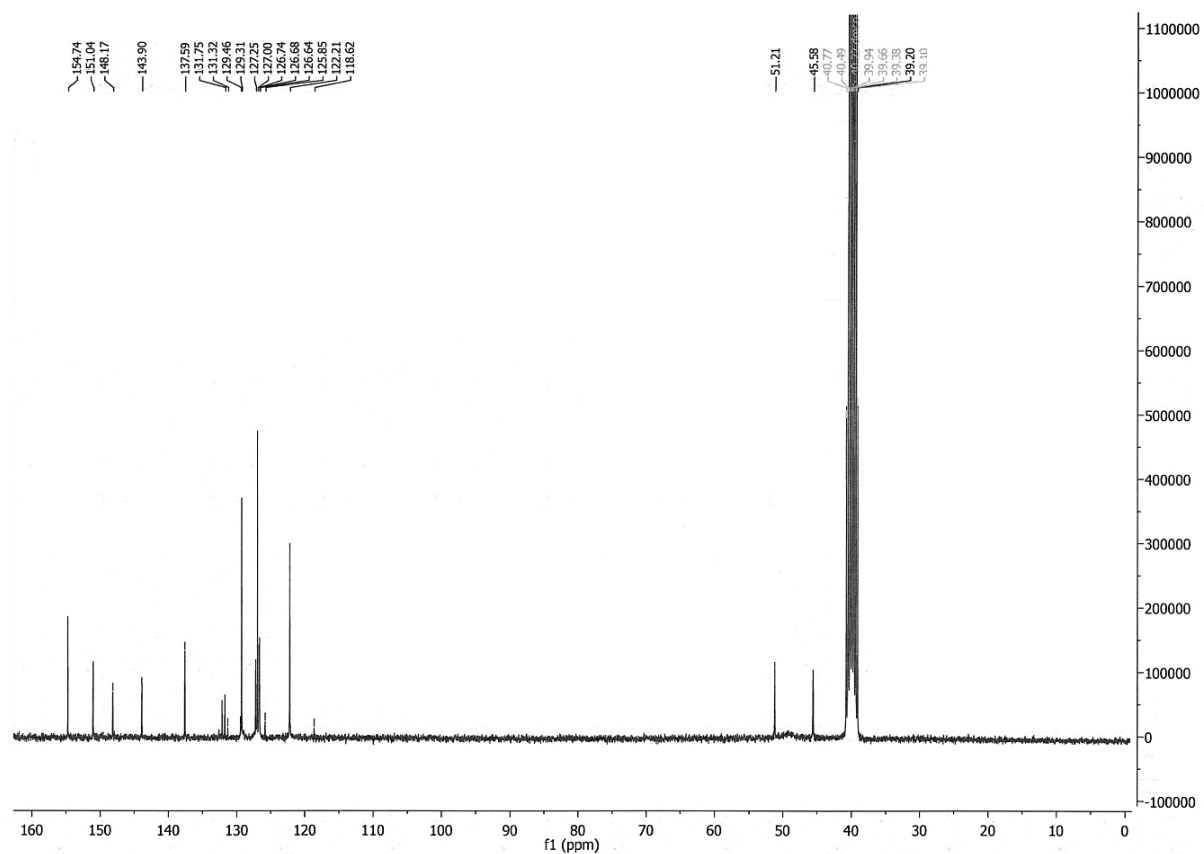
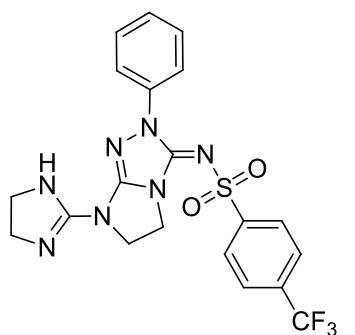
^1H -NMR (DMSO- d_6 , 500 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-(trifluoromethyl)benzenesulfonamide (**5n**)



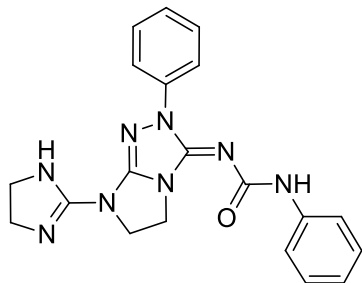
INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	4035.053	8.073	13.0	17	2158.473	4.319	11.6
2	4026.752	8.057	15.7	18	2150.172	4.302	12.1
3	3965.224	7.934	17.3	19	2142.648	4.287	5.2
4	3956.923	7.917	13.2	20	1753.664	3.509	22.4
5	3892.854	7.789	15.4	21	1667.233	3.336	10.6
6	3891.878	7.787	14.2	22	1248.750	2.498	27.9
7	3884.165	7.771	16.1	23	1246.797	2.495	34.7
8	3728.682	7.461	8.7	24	1245.332	2.492	24.9
9	3721.557	7.446	16.3				
10	3713.256	7.428	9.7				
11	3658.565	7.320	5.1				
12	3651.240	7.305	8.1				
13	2209.746	4.421	6.2				
14	2202.421	4.407	13.1				
15	2199.492	4.401	6.8				
16	2193.632	4.389	11.7				



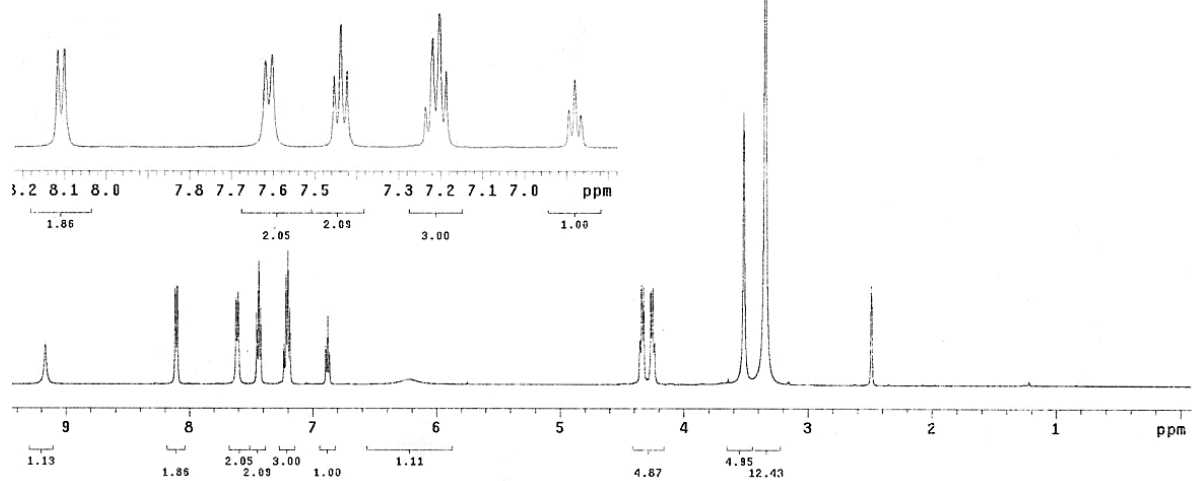
^{13}C -NMR ($\text{DMSO-}d_6$, 75 MHz) spectrum of *N*-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-4-(trifluoromethyl)benzenesulfonamide (**5n**)



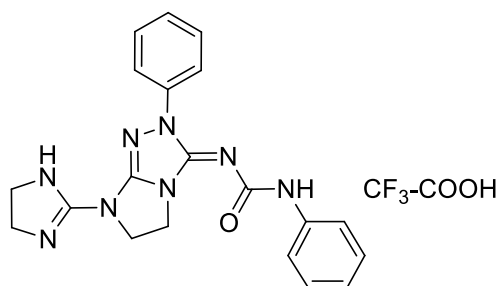
^1H -NMR (DMSO- d_6 , 500 MHz) spectrum of 1-(7-(4,5-dihydro-1H-imidazol-2-yl)-2-phenyl-6,7-dihydro-2H-imidazo[2,1-c][1,2,4]triazol-3(5H)-ylidene)-3-phenylurea (**6a**)



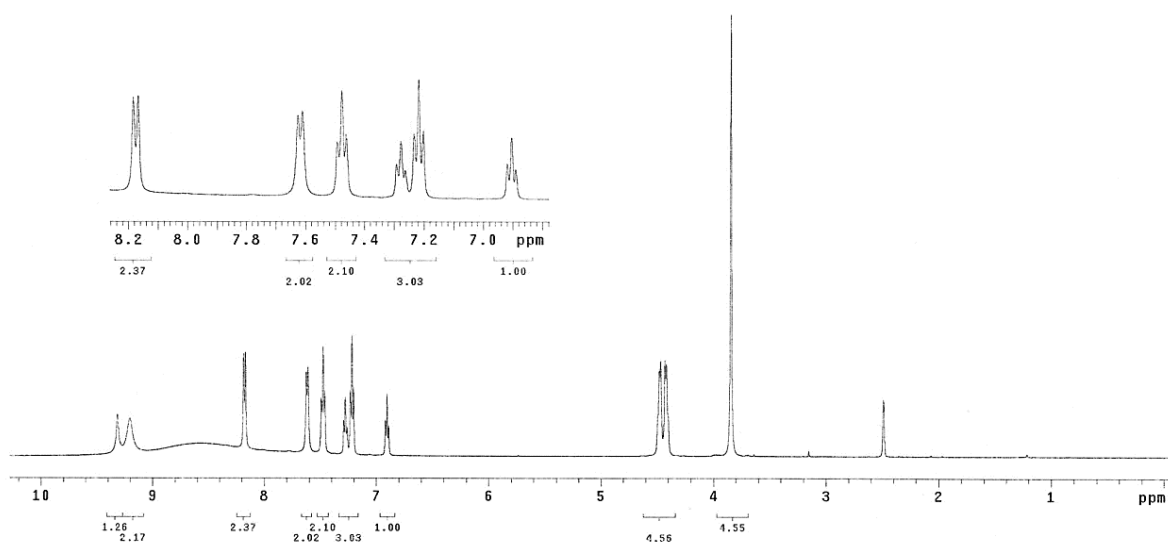
INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	4583.489	9.170	5.0	14	3438.400	6.879	8.6	27	1243.930	2.489	12.5
2	4056.113	8.115	12.2	15	3431.075	6.805	4.1	28	1242.465	2.486	10.1
3	4048.300	8.100	12.4	16	3105.860	6.214	0.7				
4	3607.563	7.618	11.0	17	2175.627	4.353	5.5				
5	3739.750	7.602	11.7	18	2169.791	4.339	12.5				
6	3725.527	7.454	9.0	19	2159.490	4.323	12.2				
7	3717.225	7.437	15.5	20	2147.794	4.297	0.8				
8	3709.412	7.422	9.6	21	2131.678	4.265	11.7				
9	3616.633	7.236	5.1	22	2123.866	4.249	12.2				
10	3607.355	7.217	13.8	23	2116.053	4.234	5.4				
11	3599.542	7.202	16.9	24	1821.114	3.644	0.8				
12	3591.723	7.186	9.6	25	1758.121	3.518	34.3				
13	3445.724	6.894	4.8	26	1671.202	3.344	73.9				



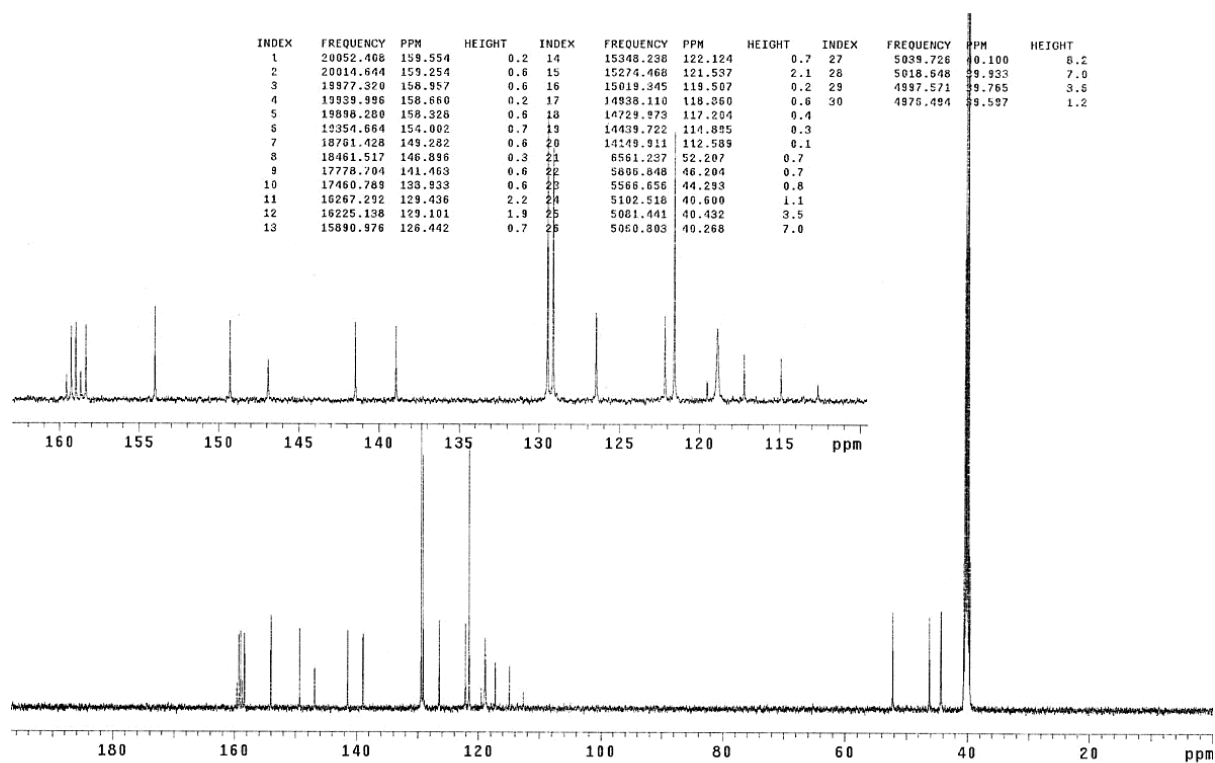
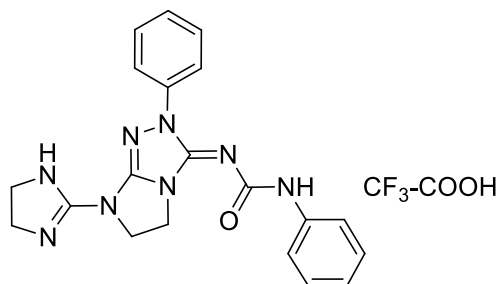
^1H -NMR (DMSO- d_6 +TFA, 500 MHz) spectrum of 1-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-3-phenylurea(**6a**)



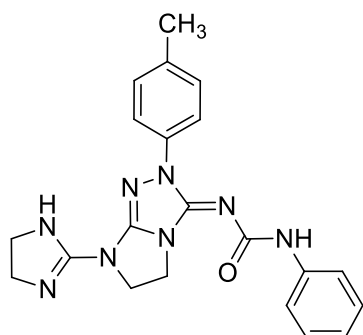
FREQUENCY	PPM	HEIGHT			
4655.271	9.314	4.3	3615.168	7.233	6.9
4599.603	9.203	3.9	3606.667	7.216	12.5
4090.295	8.184	10.7	3599.542	7.202	7.1
4081.994	8.167	10.9	3457.444	6.917	3.8
3810.981	7.625	8.6	3450.608	6.904	6.5
3803.656	7.610	9.2	3443.283	6.889	3.2
3745.054	7.493	6.1	2237.643	4.477	9.1
3737.246	7.477	11.4	2231.783	4.465	9.9
3729.433	7.462	6.8	2213.227	4.428	10.0
3643.979	7.291	3.7	2206.879	4.415	9.6
3637.142	7.277	6.1	1921.706	3.845	46.0
3629.818	7.262	3.1	1243.930	2.489	5.9



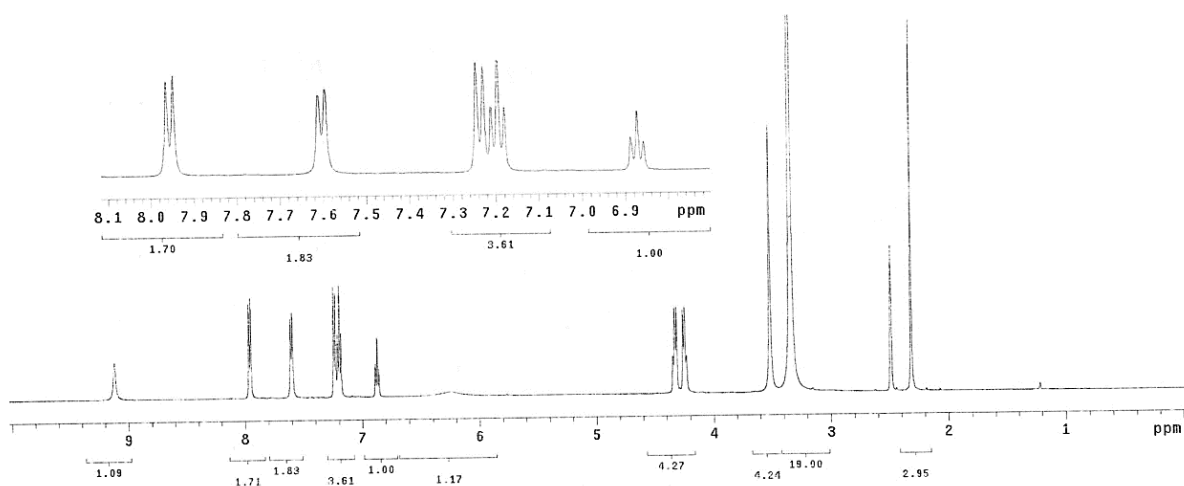
^{13}C -NMR (DMSO- d_6 +TFA, 125 MHz) spectrum of 1-(7-(4,5-dihydro-1H-imidazol-2-yl)-2-phenyl-6,7-dihydro-2H-imidazo[2,1-c][1,2,4]triazol-3(5H)-ylidene)-3-phenylurea (**6a**)



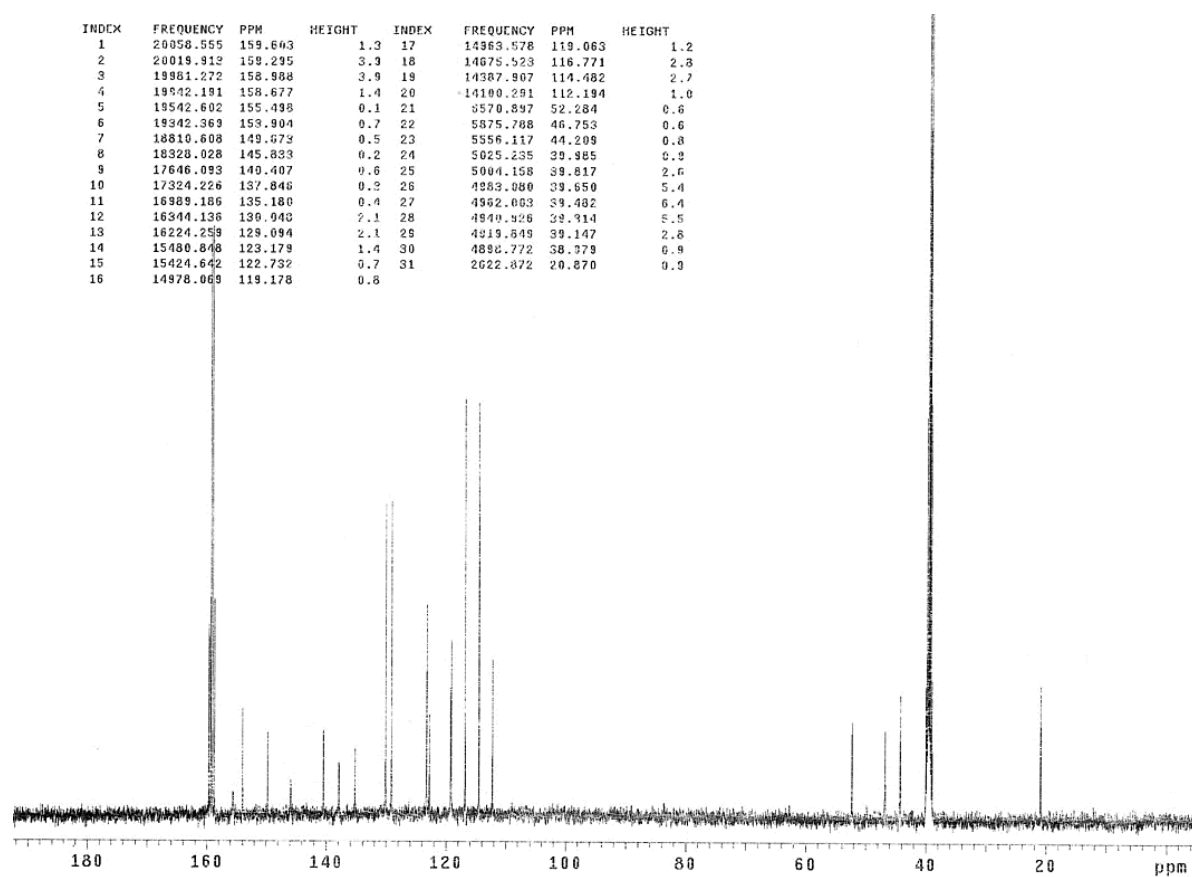
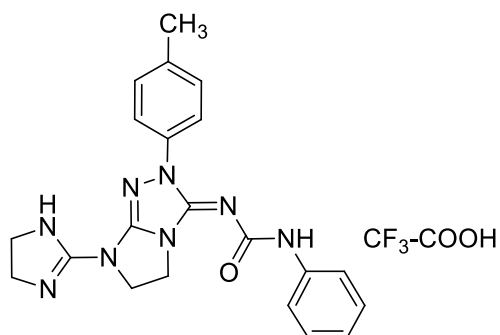
^1H -NMR (DMSO- d_6 , 500 MHz) spectrum of 1-(7-(4,5-dihydro-1H-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2H-imidazo[2,1-*c*][1,2,4]triazol-3(5H)-ylidene)-3-phenylurea (**6b**)



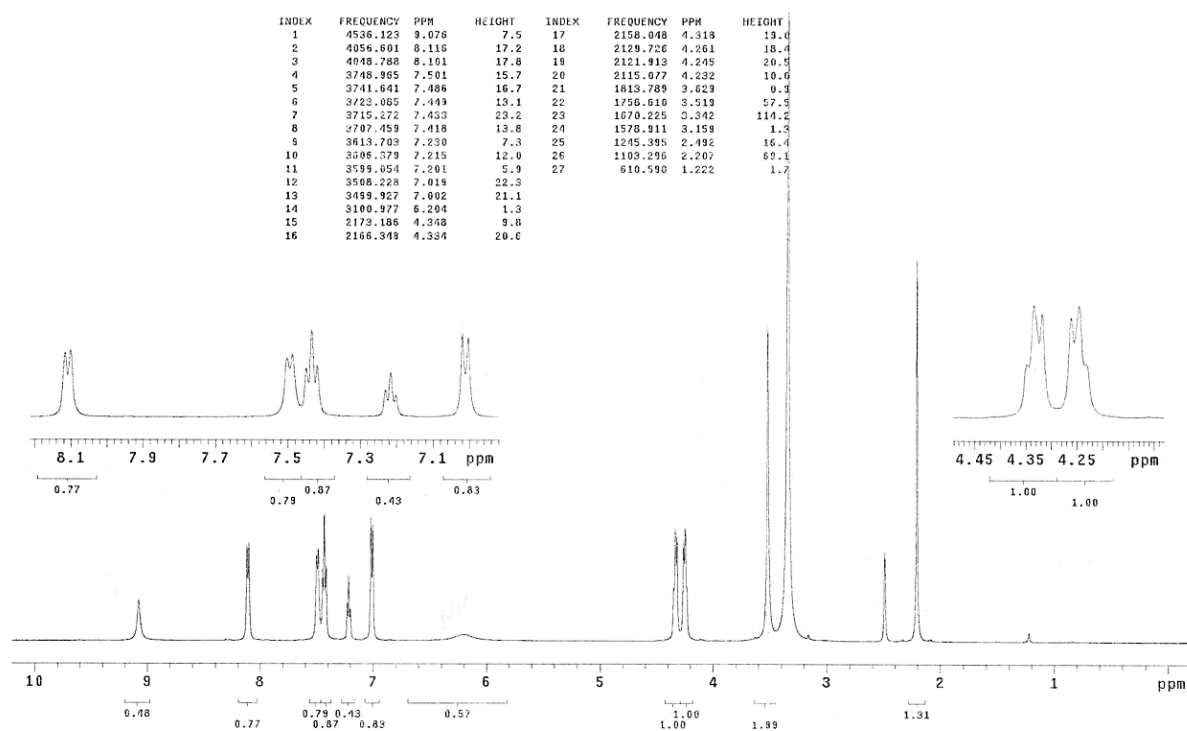
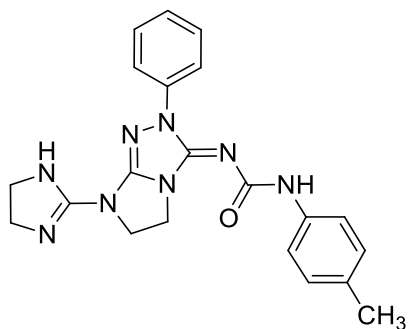
FREQUENCY	PPM	HEIGHT	FREQUENCY	PPM	HEIGHT
4558.097	9.120	14.3	2171.721	4.345	14.5
3980.425	7.964	36.4	2154.396	4.336	33.5
3972.124	7.947	38.5	2156.095	4.314	33.2
3804.145	7.611	38.4	2128.750	4.259	32.0
3795.843	7.595	32.8	2120.937	4.243	32.3
3621.028	7.245	42.4	2113.124	4.228	14.7
3612.727	7.228	40.5	1756.657	3.515	102.7
3603.937	7.211	25.0	1668.272	3.338	457.3
3596.124	7.195	43.9	1243.442	2.488	55.9
3587.823	7.178	24.7	1157.011	2.315	142.5
3441.818	6.586	12.9			
3434.493	6.872	22.8			
3427.169	6.857	11.1			



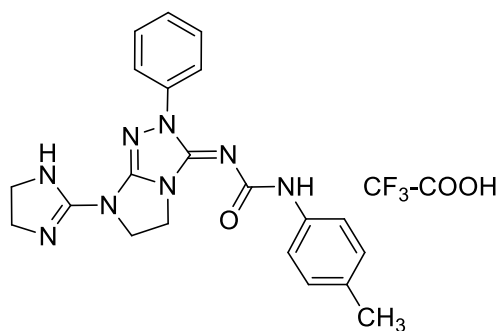
^{13}C -NMR (DMSO- d_6 +TFA, 125 MHz) spectrum of 1-(7-(4,5-dihydro-1H-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2H-imidazo[2,1-*c*][1,2,4]triazol-3(5H)-ylidene)-3-phenylurea (**6b**)



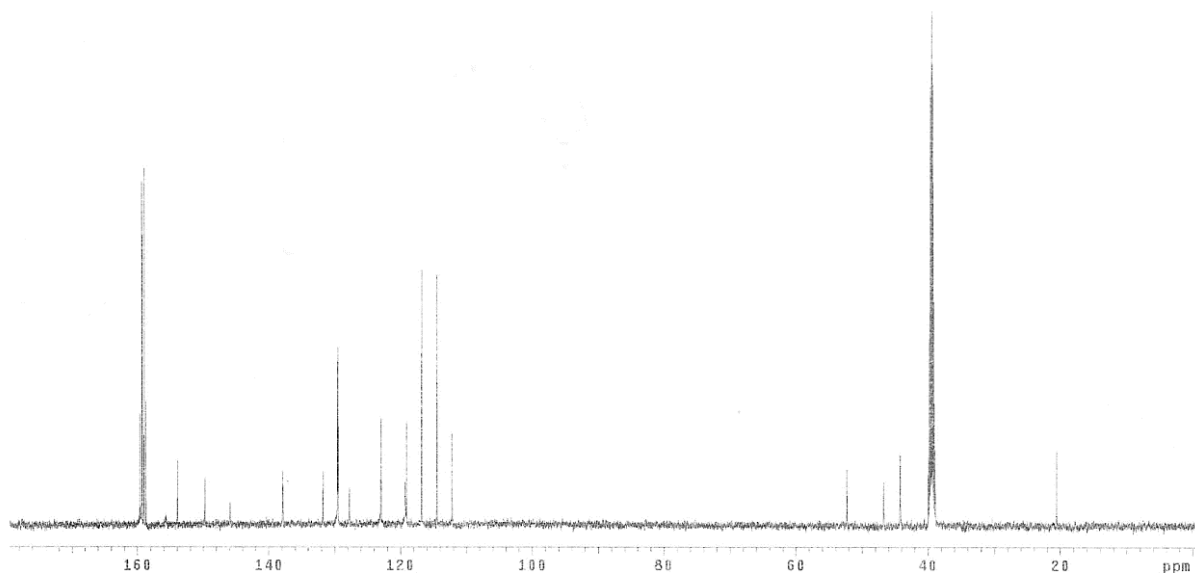
^1H -NMR ($\text{DMSO}-d_6$, 500 MHz) spectrum of 1-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-3-(*p*-tolyl)urea (**6c**)



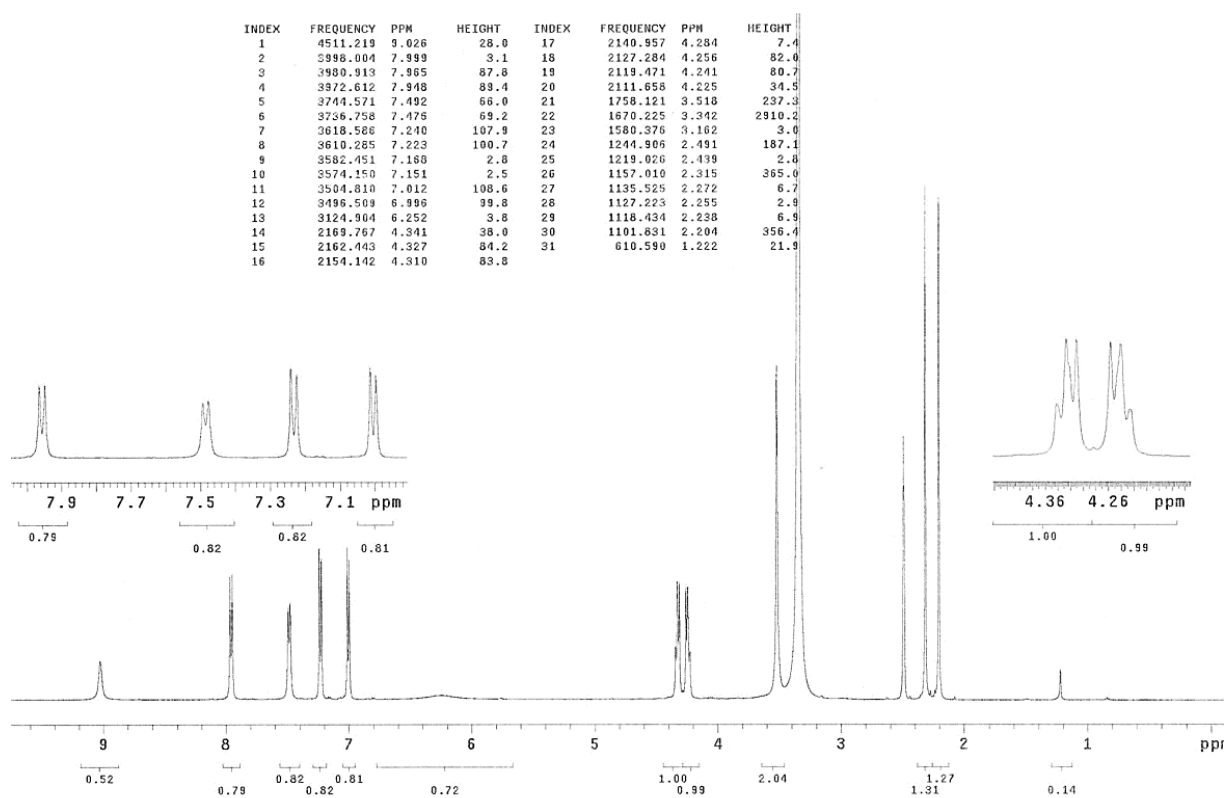
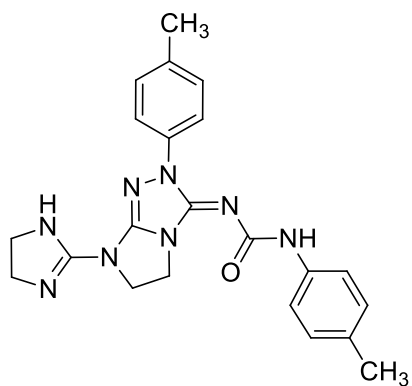
^{13}C -NMR (DMSO- d_6 +TFA, 125 MHz) spectrum of 1-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-3-(*p*-tolyl)urea (**6c**)



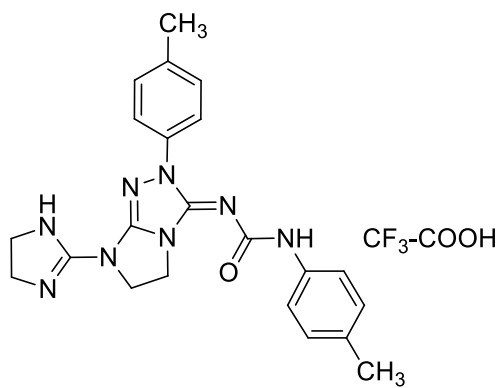
FREQUENCY	PPM	HEIGHT	14986.412	119.245	0.3
20057.238	159.592	0.8	14960.505	119.039	0.8
20018.157	159.282	2.6	14672.889	118.759	1.9
19979.515	158.974	2.7	14385.273	114.461	1.9
19940.435	158.663	0.9	14097.656	112.173	0.7
19343.686	153.915	0.5	6568.791	52.266	0.4
18815.000	149.708	0.8	5870.519	46.711	0.3
18333.297	145.875	0.2	5554.361	44.195	0.5
17324.226	137.946	0.4	5017.770	39.926	0.5
17317.200	137.790	0.2	4996.993	39.758	1.6
16560.177	131.767	0.4	4975.616	39.590	3.3
16264.856	129.576	1.2	4954.538	39.423	3.9
16273.000	129.482	1.3	4933.461	39.255	3.3
16053.446	127.735	6.3	4912.384	39.087	1.7
15451.428	122.945	0.8	4891.307	38.919	0.6
			2585.548	29.573	0.6



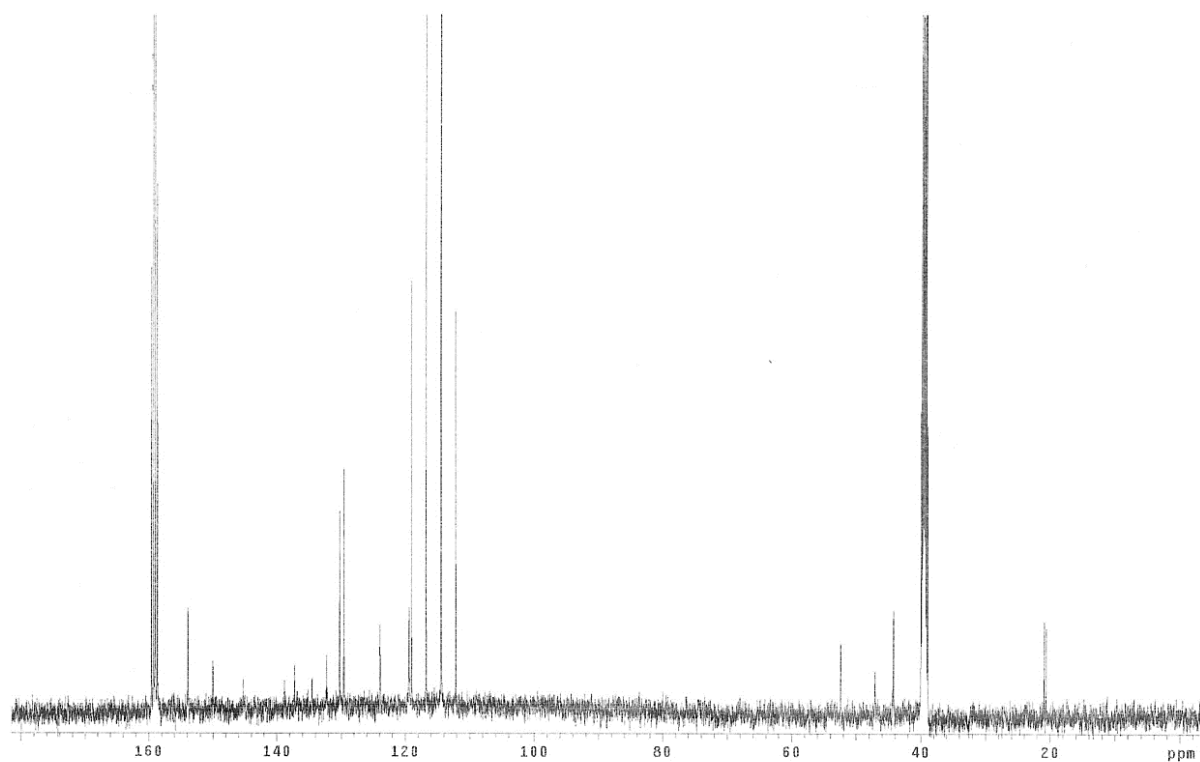
^1H -NMR (DMSO- d_6 , 500 MHz) spectrum of 1-(7-(4,5-dihydro-1H-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2H-imidazo[2,1-*c*][1,2,4]triazol-3(5H)-ylidene)-3-(*p*-tolyl)urea (**6d**)



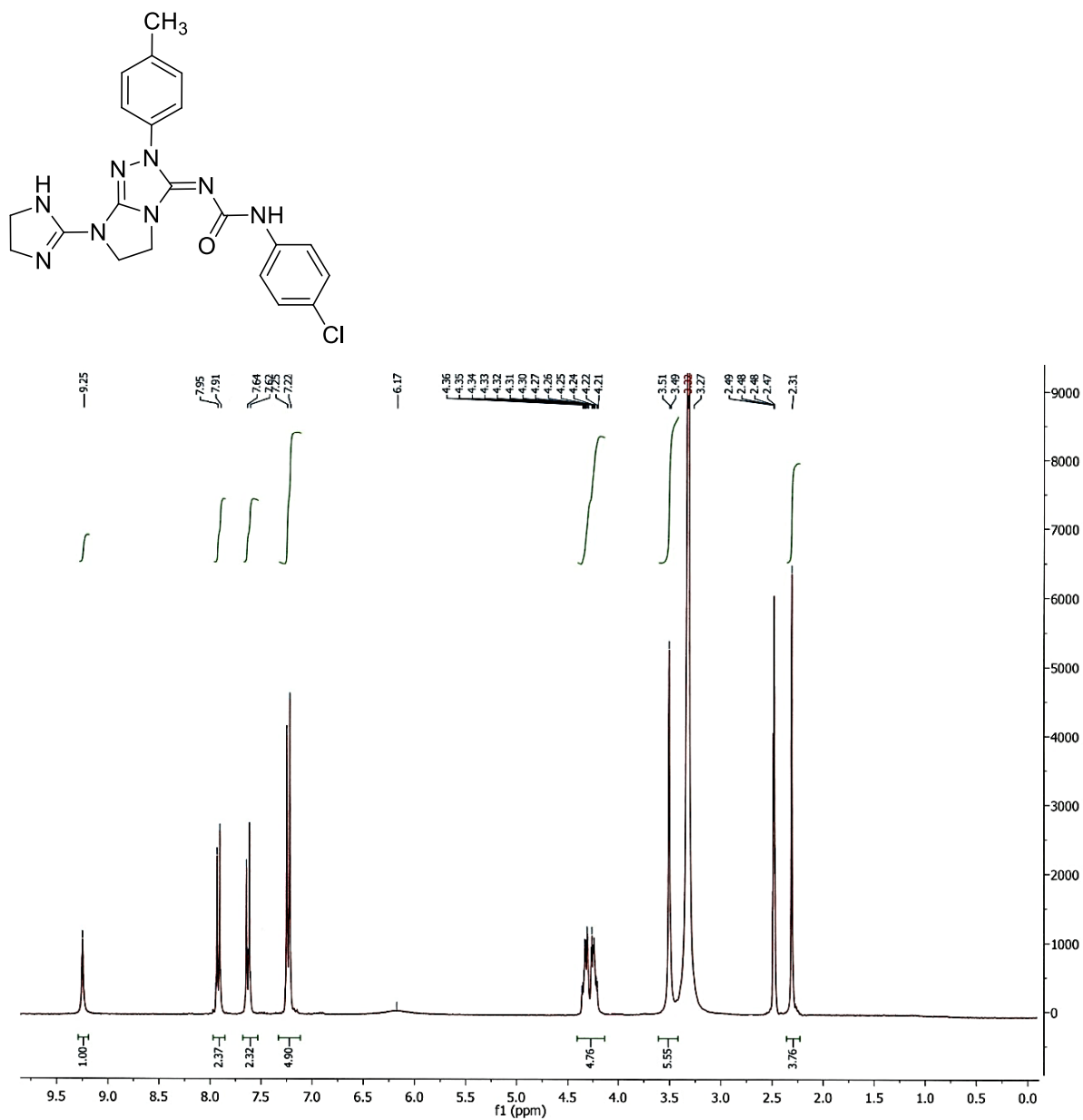
^{13}C -NMR (DMSO- d_6 +TFA, 125 MHz) spectrum of 1-(7-(4,5-dihydro-1H-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2H-imidazo[2,1-*c*][1,2,4]triazol-3(5H)-ylidene)-3-(*p*-tolyl)urea (**6d**)



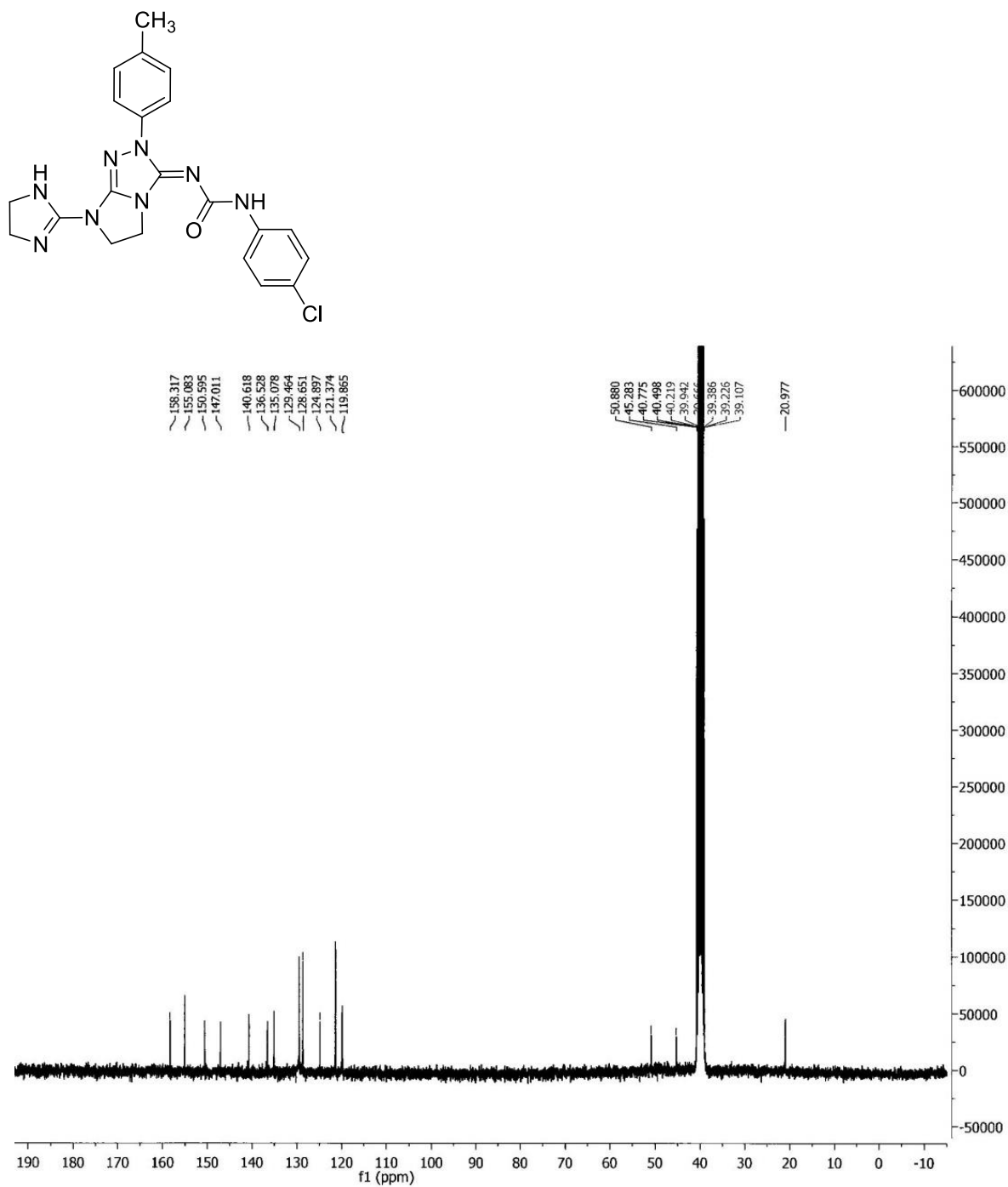
FREQUENCY	PPM	HEIGHT	14956.114	115.004	2.7
20054.164	159.568	2.8	14668.498	116.713	7.0
20015.083	159.257	9.1	14380.881	114.427	6.9
19976.002	158.946	9.4	14093.265	112.138	2.6
19937.361	158.639	3.4	6584.070	52.383	0.4
19342.368	153.904	0.7	5921.455	47.116	0.3
18852.763	150.009	0.3	5558.752	44.230	0.6
18254.726	145.251	0.2	5017.331	39.922	1.9
17443.224	138.793	0.2	4996.254	39.754	5.8
17249.138	137.249	0.3	4975.176	39.567	11.4
16906.195	134.520	0.2	4954.099	39.419	13.3
16620.335	132.246	0.4	4933.022	39.251	11.4
16370.043	130.254	1.3	4911.945	39.084	5.7
16286.173	129.587	1.5	4890.868	38.916	1.6
15573.930	123.920	0.6	2624.189	20.850	0.6
15003.976	119.384	0.7	2586.426	20.530	0.5



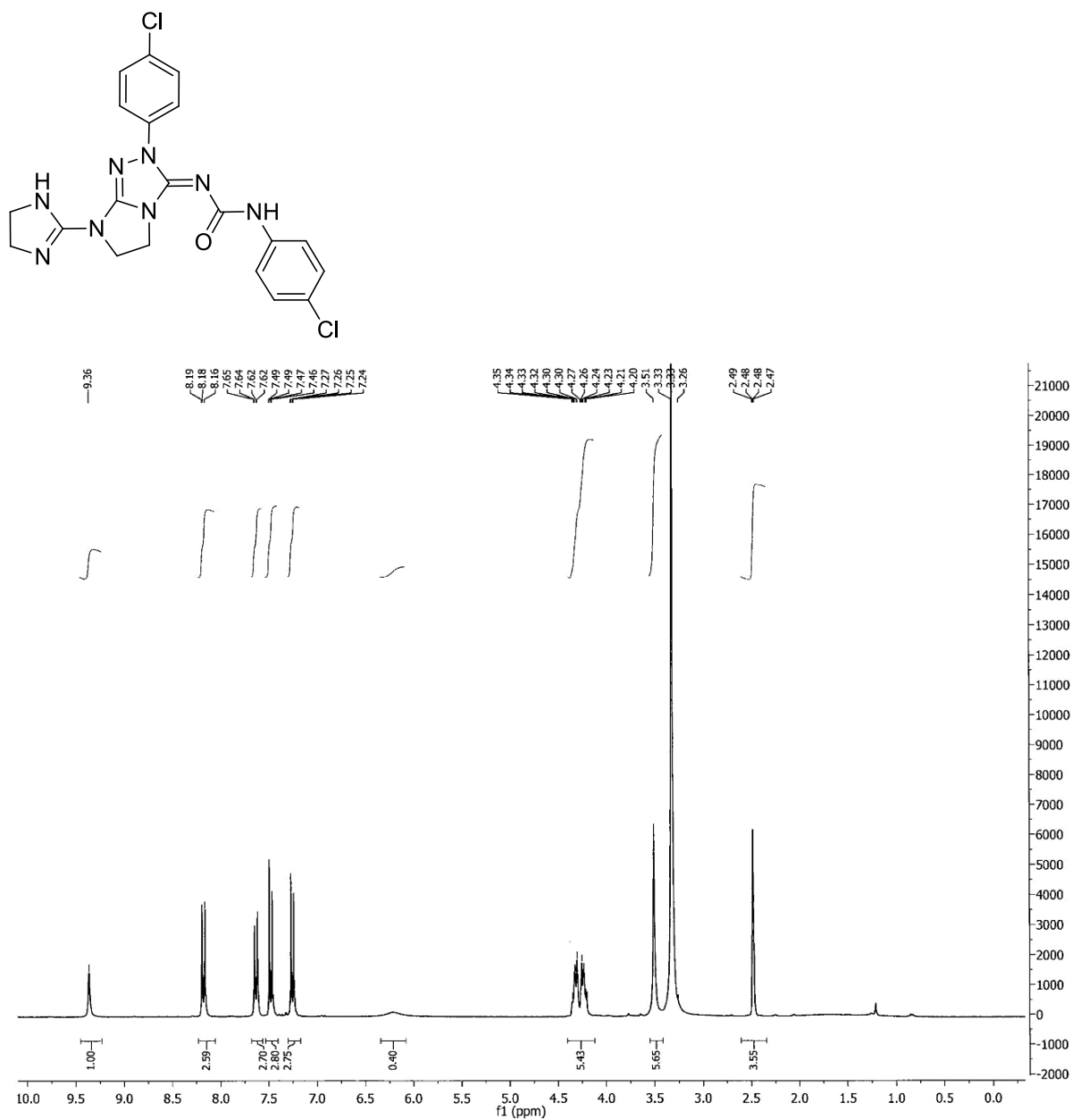
^1H -NMR (DMSO- d_6 , 300 MHz) spectrum of 1-(4-chlorophenyl)-3-(7-(4,5-dihydro-1H-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2H-imidazo[2,1-*c*][1,2,4]triazol-3(5H)-ylidene)urea (**6e**)



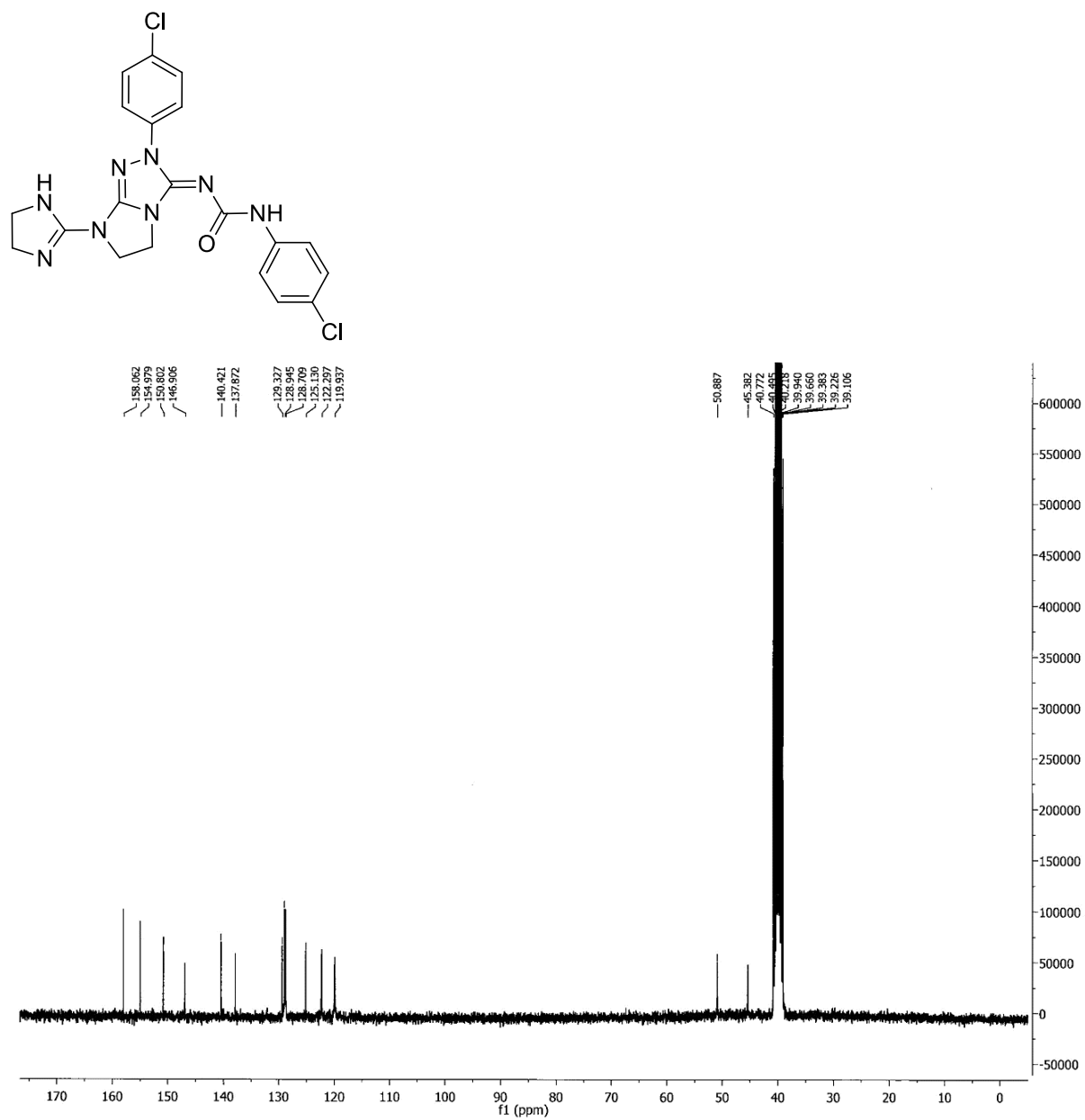
^{13}C -NMR (DMSO- d_6 , 75 MHz) spectrum of 1-(4-chlorophenyl)-3-(7-(4,5-dihydro-1H-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2H-imidazo[2,1-*c*][1,2,4]triazol-3(5H)-ylidene)urea (**6e**)



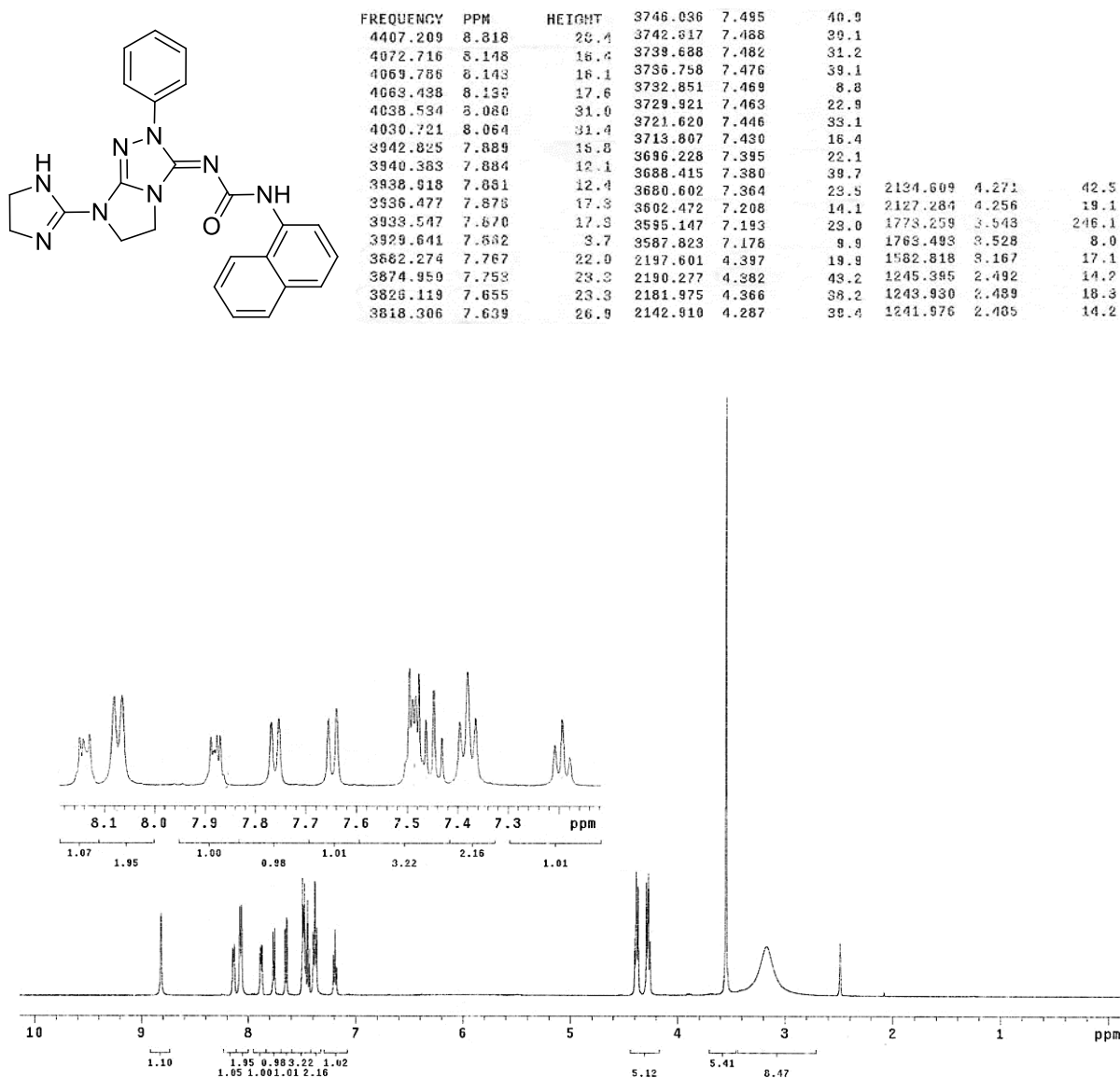
^1H -NMR ($\text{DMSO-}d_6$, 300 MHz) spectrum of 1-(4-chlorophenyl)-3-(2-(4-chlorophenyl)-7-(4,5-dihydro-1H-imidazol-2-yl)-6,7-dihydro-2H-imidazo[2,1-*c*][1,2,4]triazol-3(5H)-ylidene)urea (**6f**)



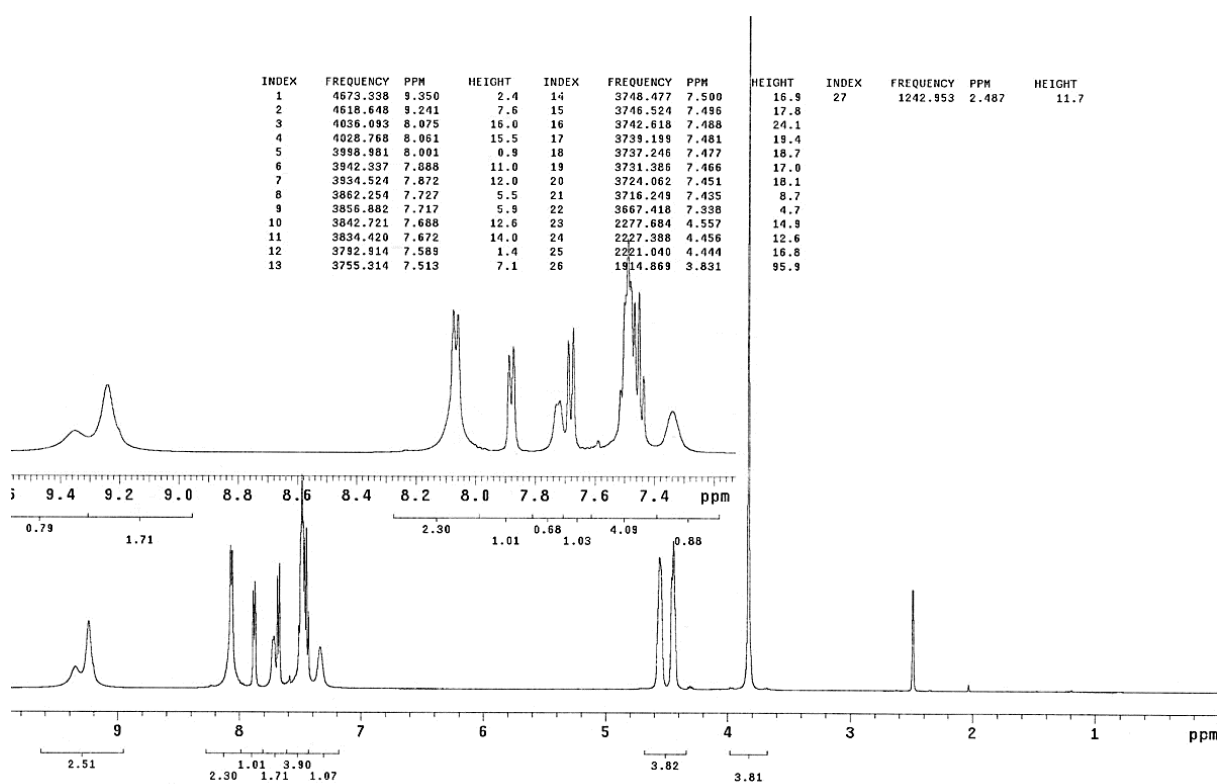
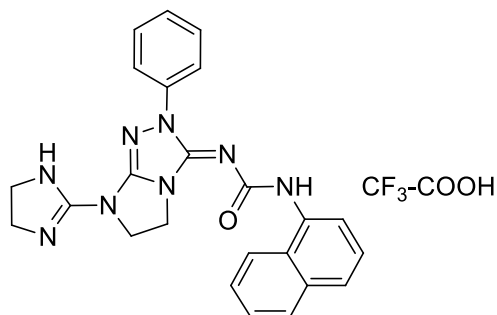
^{13}C -NMR ($\text{DMSO-}d_6$, 75 MHz) spectrum of 1-(4-chlorophenyl)-3-(2-(4-chlorophenyl)-7-(4,5-dihydro-1H-imidazol-2-yl)-6,7-dihydro-2H-imidazo[2,1-c][1,2,4]triazol-3(5H)-ylidene)urea (**6f**)



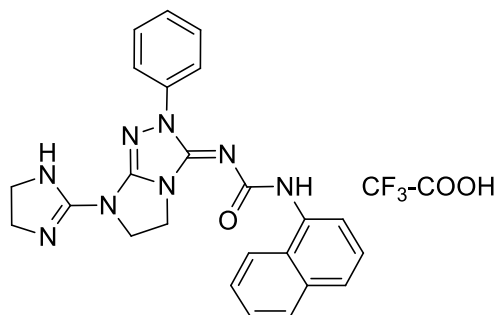
^1H -NMR (DMSO- d_6 , 500 MHz) spectrum of 1-(7-(4,5-dihydro-1H-imidazol-2-yl)-2-phenyl-6,7-dihydro-2H-imidazo[2,1- c][1,2,4]triazol-3(5H)-ylidene)-3-(naphthalen-1-yl)urea (**6g**) recorded at a temperature of 70°C



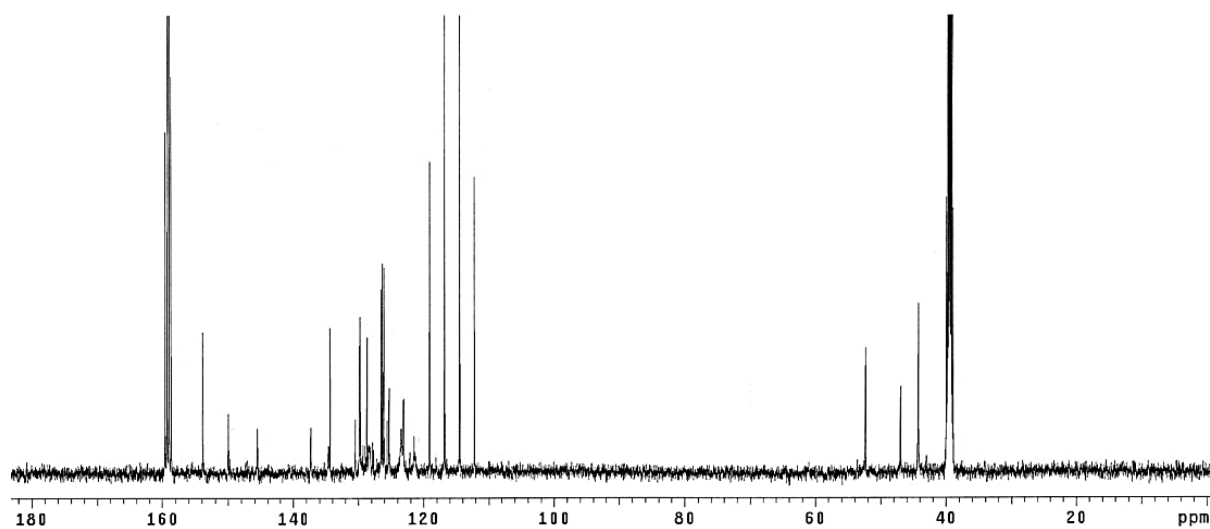
^1H -NMR (DMSO- d_6 +TFA, 500 MHz) spectrum of 1-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-3-(naphthalen-1-yl)urea (**6g**)



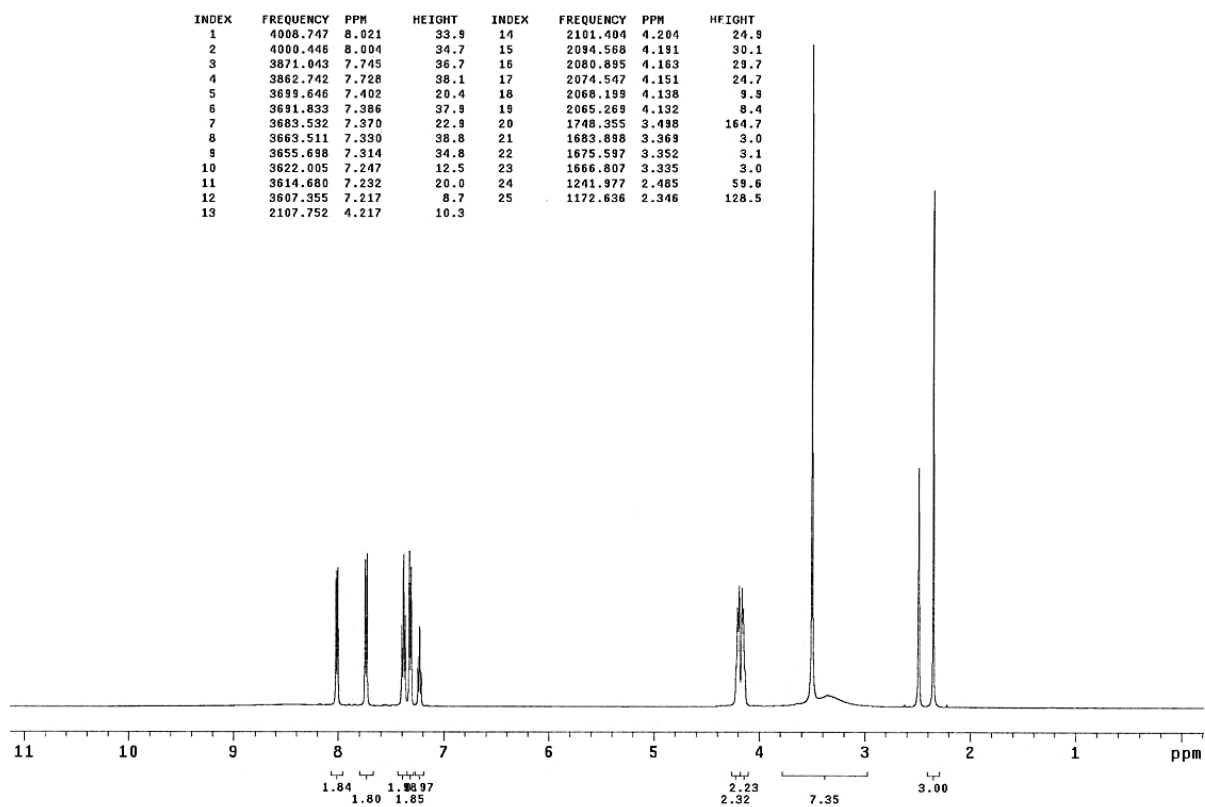
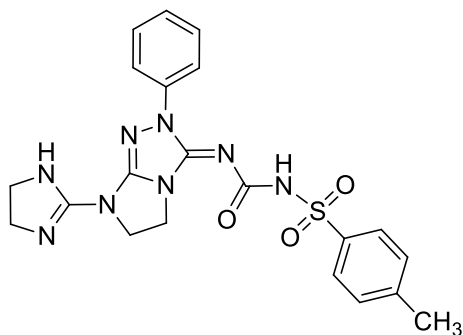
^{13}C -NMR (DMSO- d_6 +TFA, 125 MHz) spectrum of 1-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-3-(naphthalen-1-yl)urea (**6g**)



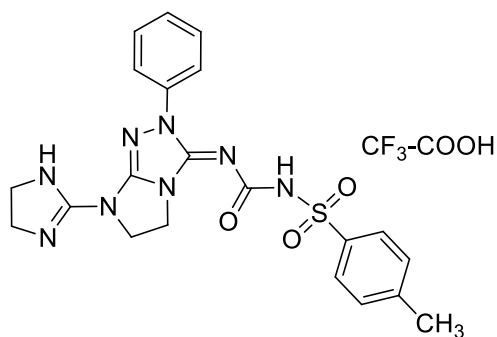
INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	20058.555	159.603	2.7	17	16060.911	127.794	0.2	33	5022.161	39.961	2.2
2	20019.913	159.295	8.6	18	15898.441	126.502	1.4	34	5001.084	39.793	6.4
3	19981.272	158.988	9.0	19	15873.411	126.302	1.6	35	4980.007	39.625	12.8
4	19942.630	158.681	3.1	20	15843.113	126.061	1.6	36	4958.929	39.457	15.1
5	19336.417	153.873	1.1	21	15786.468	125.611	0.4	37	4937.852	39.290	12.9
6	18849.689	149.984	0.5	22	15747.826	125.303	0.7	38	4916.775	39.122	6.5
7	18294.217	145.564	0.3	23	15508.073	123.395	0.3	39	4895.698	38.954	2.1
8	17258.360	137.322	0.4	24	15471.188	123.102	0.6				
9	16909.708	134.548	0.2	25	15271.833	121.516	0.3				
10	16885.557	134.356	1.1	26	14963.139	119.059	2.4				
11	16396.829	130.467	0.4	27	14675.523	116.771	6.4				
12	16311.203	129.786	1.2	28	14387.907	114.482	6.3				
13	16251.484	129.311	0.2	29	14099.852	112.190	2.3				
14	16221.185	129.070	0.2	30	6581.435	52.368	1.0				
15	16172.005	128.678	1.1	31	5903.013	46.969	0.7				
16	16130.729	128.350	0.2	32	5558.752	44.230	1.3				



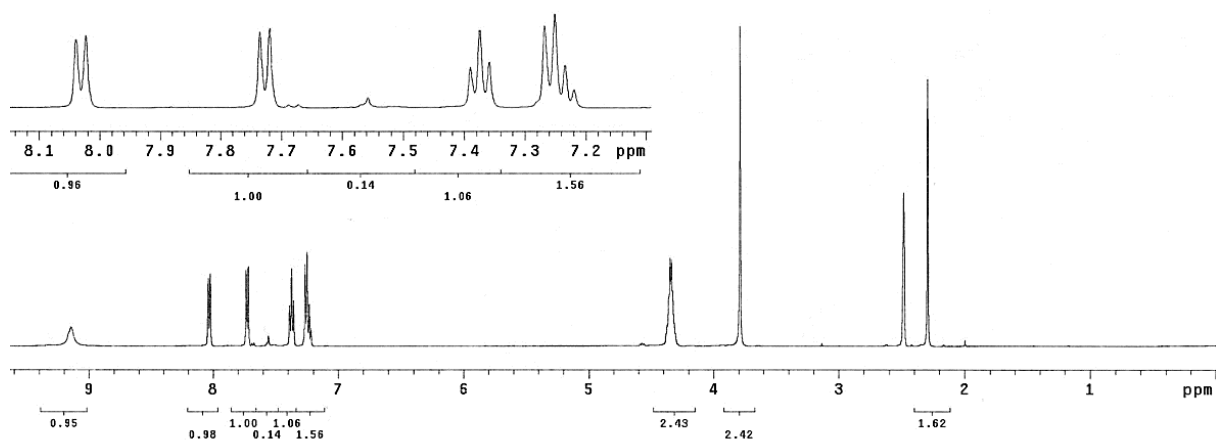
^1H -NMR ($\text{DMSO-}d_6$, 500 MHz) spectrum of *N*-((7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)carbamoyl)-4-methylbenzenesulfonamide (**6h**)



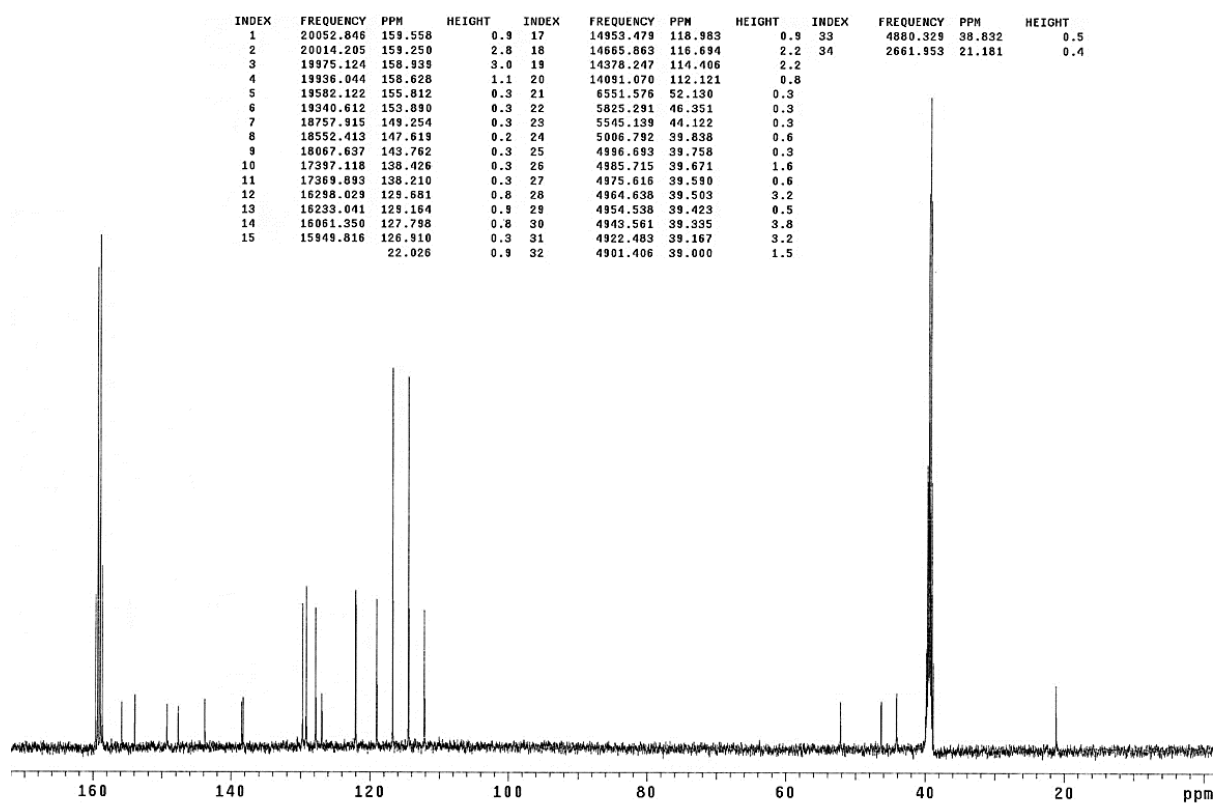
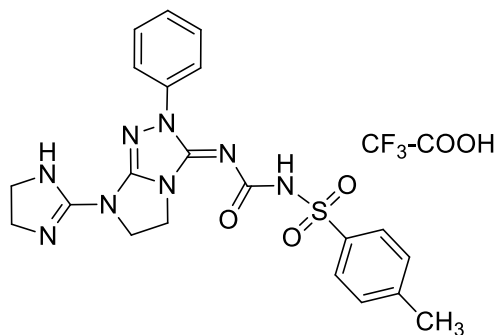
^1H -NMR ($\text{DMSO-}d_6$ +TFA, 500 MHz) spectrum of *N*-((7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)carbamoyl)-4-methylbenzenesulfonamide (**6h**)



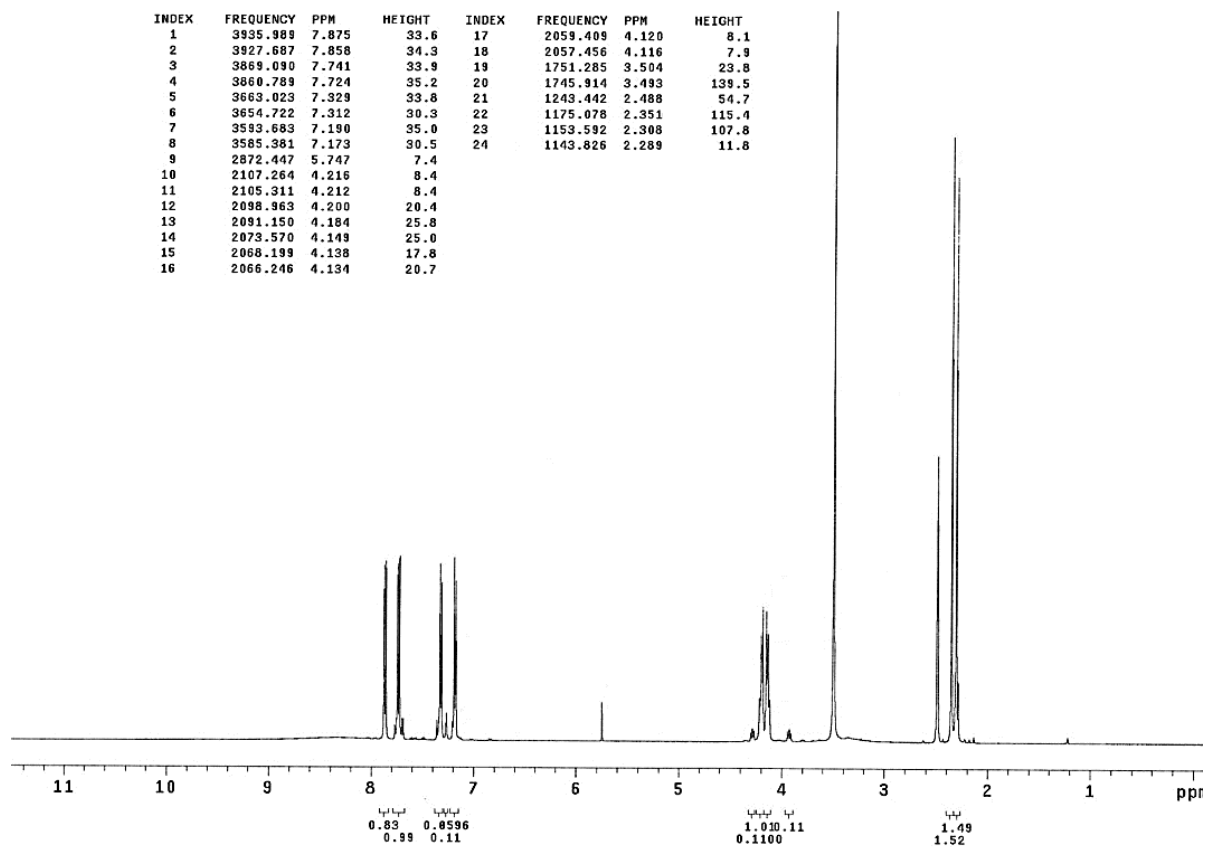
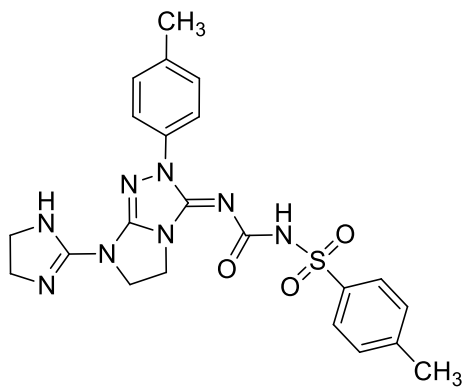
INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	4018.513	8.040	10.1				
2	4010.212	8.023	10.7				
3	3866.160	7.735	11.3				
4	3857.859	7.719	11.8				
5	3895.298	7.389	6.0				
6	3885.485	7.374	11.5				
7	3677.672	7.358	6.7				
8	3632.259	7.267	12.1				
9	3629.958	7.251	13.9				
10	3615.168	7.233	6.3				
11	2172.698	4.347	13.1				
12	2167.326	4.336	12.8				
13	2182.931	4.327	8.3				
14	1894.849	3.791	47.5				
15	1241.977	2.485	22.7				
16	1147.244	2.295	39.6				



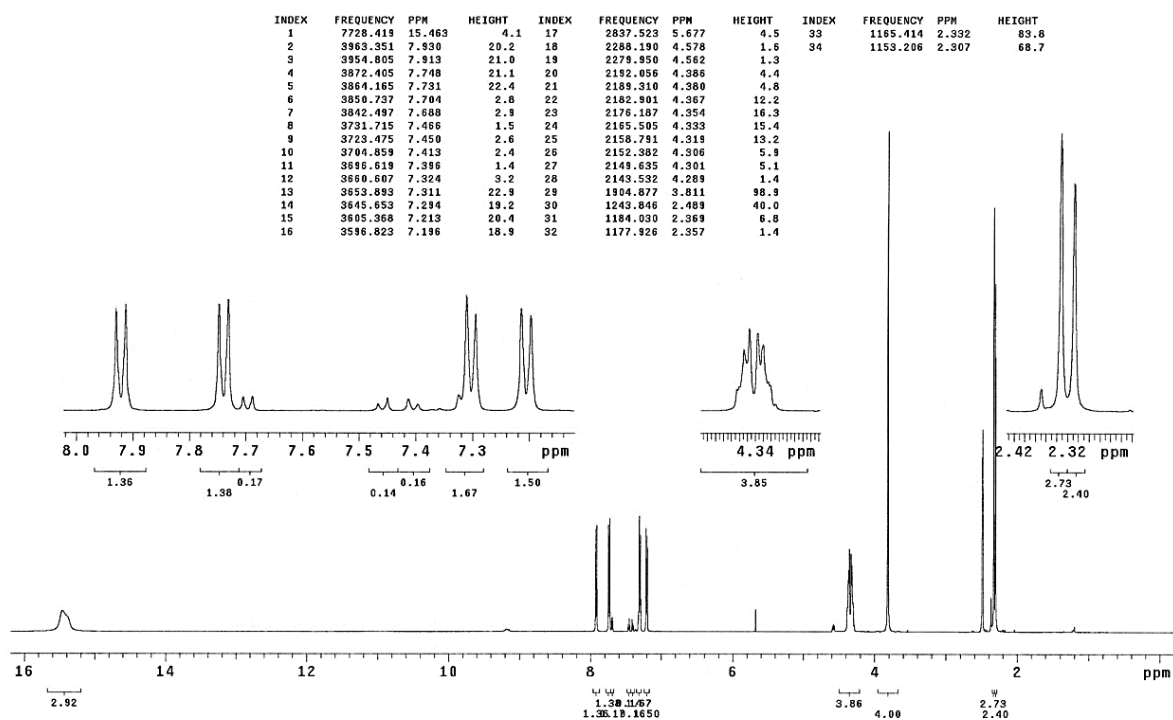
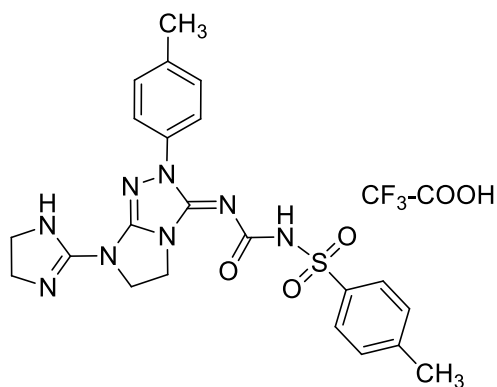
^{13}C -NMR (DMSO- d_6 +TFA, 125 MHz) spectrum of *N*-((7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)carbamoyl)-4-methylbenzenesulfonamide (**6h**)



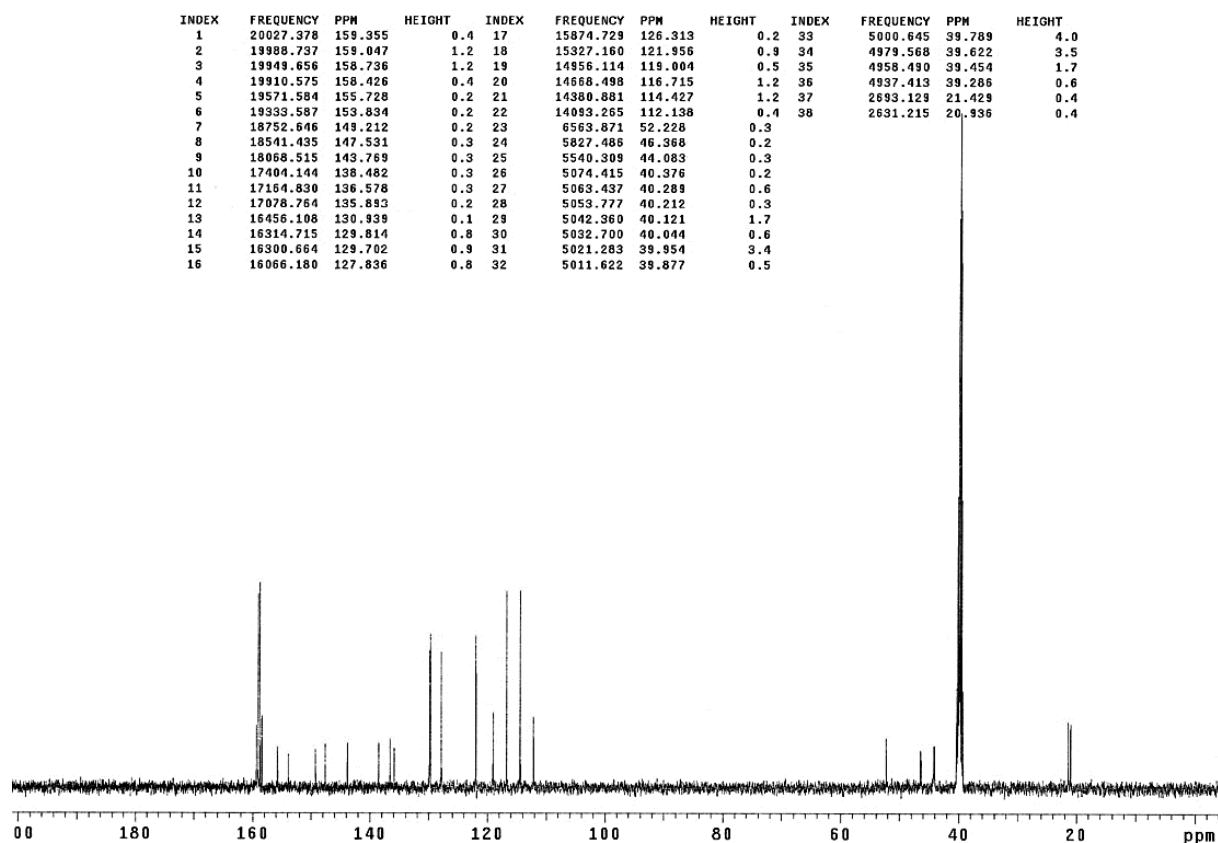
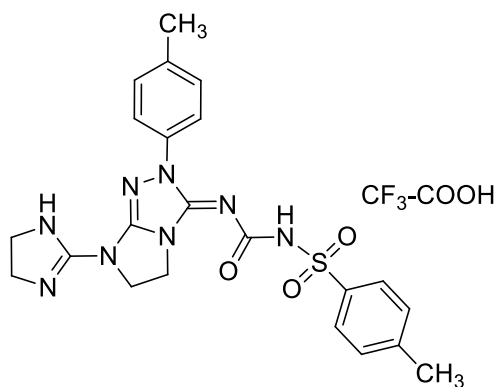
^1H -NMR (DMSO- d_6 , 500 MHz) spectrum of *N*-((7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)carbamoyl)-4-methylbenzenesulfonamide (**6i**)



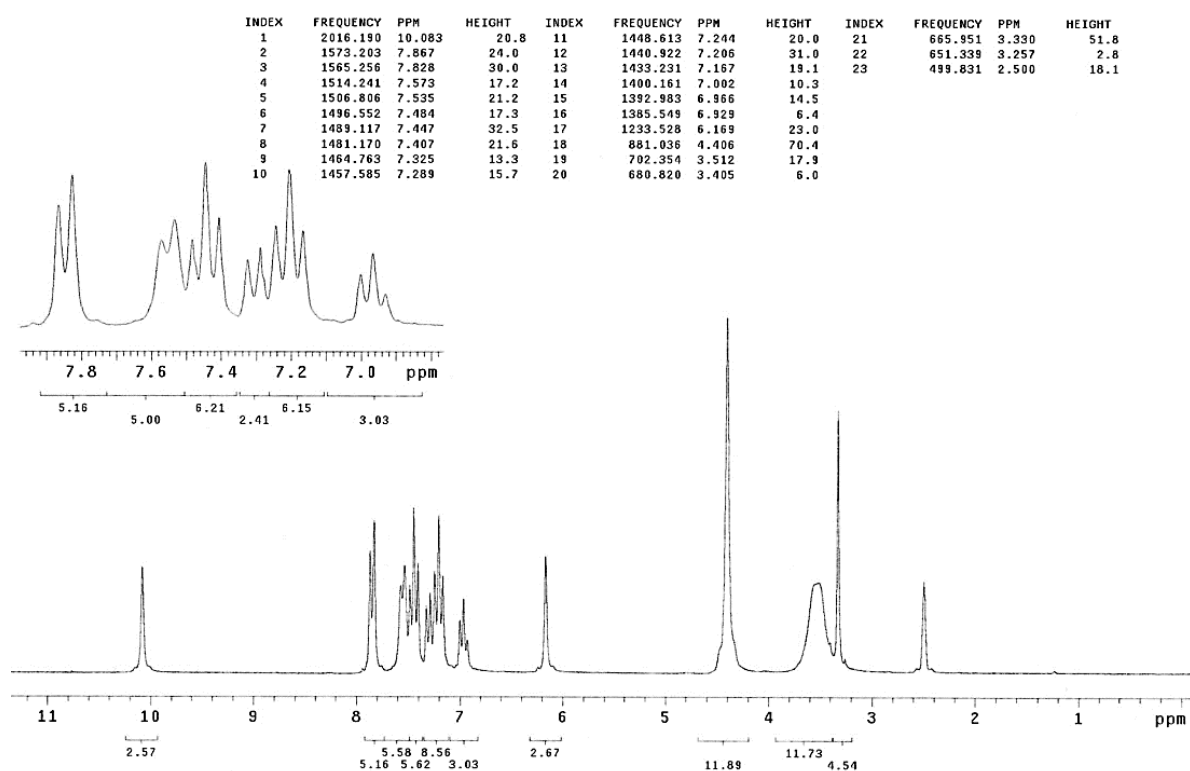
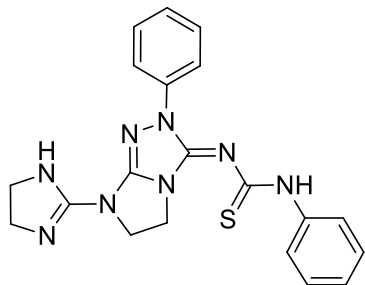
^1H -NMR ($\text{DMSO-}d_6$ +TFA, 500 MHz) spectrum of *N*-((7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)carbamoyl)-4-methylbenzenesulfonamide (**6i**)



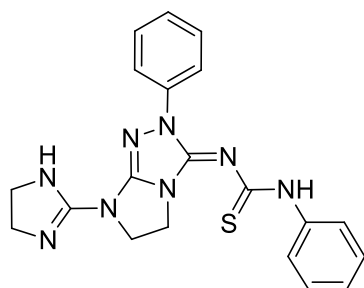
^{13}C -NMR ($\text{DMSO-}d_6$ +TFA, 125 MHz) spectrum of *N*-((7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)carbamoyl)-4-methylbenzenesulfonamide (**6i**)



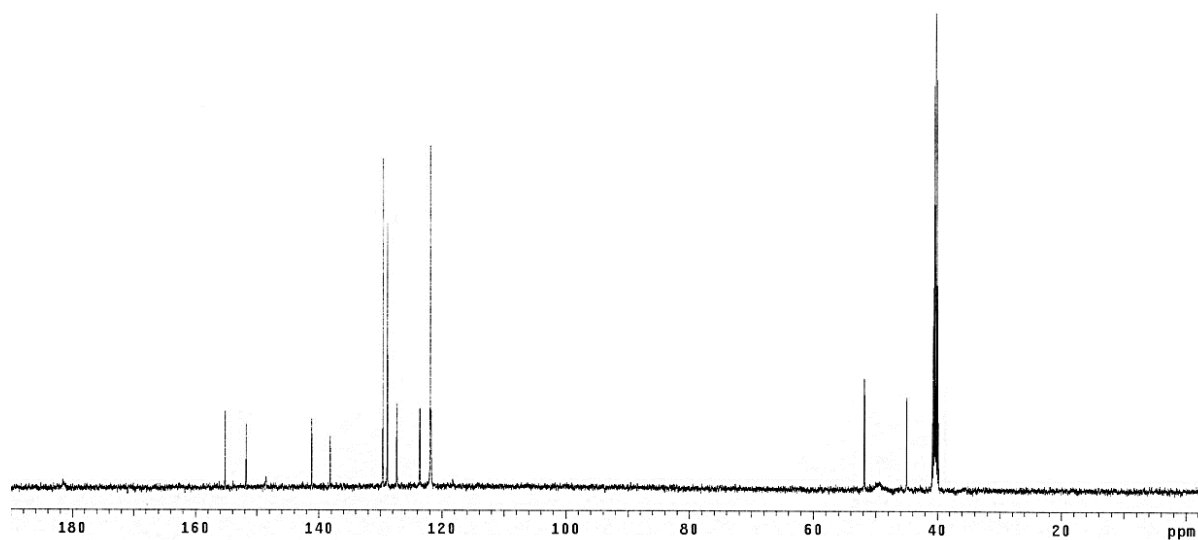
^1H -NMR (DMSO- d_6 , 500 MHz) spectrum of 1-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-3-phenylthiourea (**7a**)



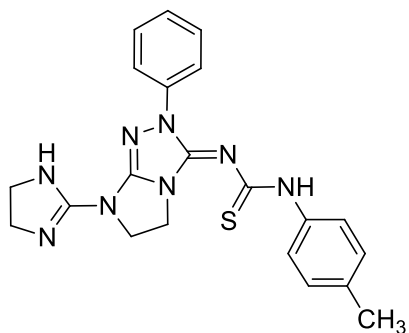
^{13}C -NMR (DMSO- d_6 , 125 MHz) spectrum of 1-(7-(4,5-dihydro-1H-imidazol-2-yl)-2-phenyl-6,7-dihydro-2H-imidazo[2,1-c][1,2,4]triazol-3(5H)-ylidene)-3-phenylthiourea (**7a**) recorded at a temperature of 40°C



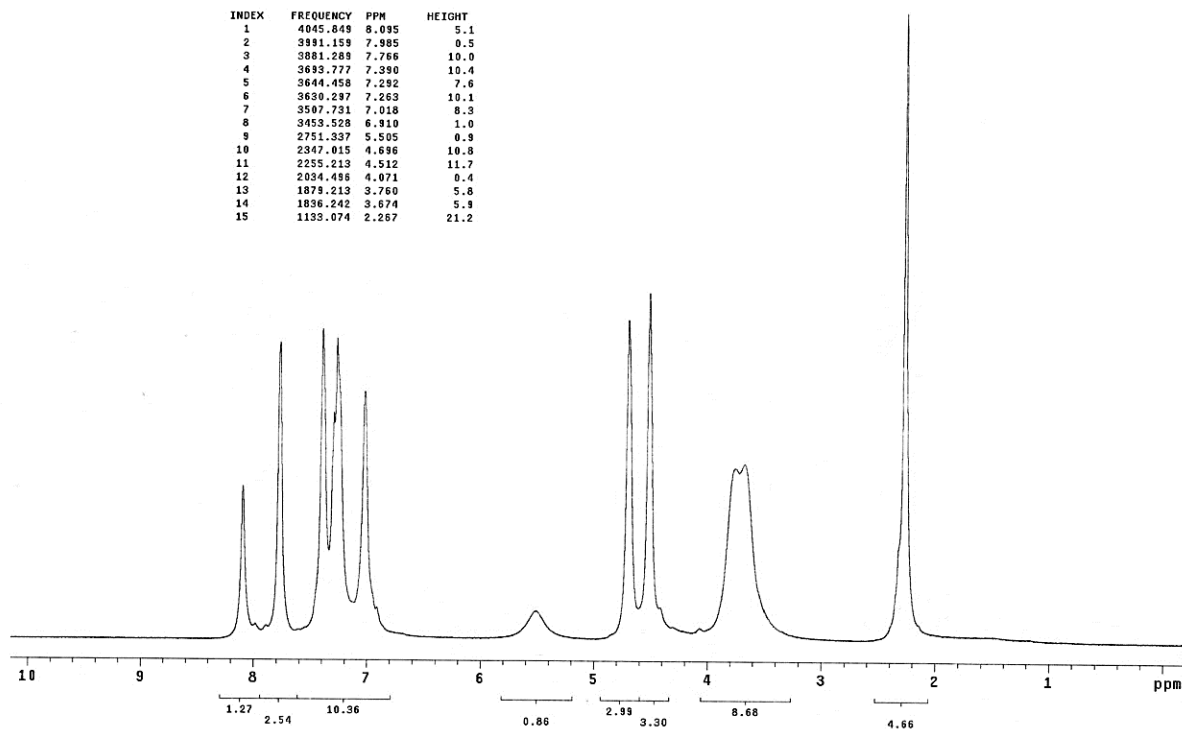
FREQUENCY	PPM	HEIGHT	15306.961	121.795	3.5
22815.278	181.538	0.4	14864.779	118.277	0.4
19503.961	155.190	3.4	6516.008	51.847	5.0
19071.439	151.749	2.8	6201.167	49.342	0.3
18672.289	148.573	0.5	5653.160	44.981	4.1
17737.866	141.138	3.1	5129.743	40.817	3.0
17365.063	138.171	2.3	5108.665	40.649	9.1
16282.221	129.555	14.9	5087.588	40.481	18.2
16193.082	128.846	12.1	5066.950	40.317	21.5
15995.484	127.274	3.8	5045.873	40.149	18.5
15531.785	123.584	3.6	5024.796	39.982	9.2
15318.817	121.890	15.5 ...	5003.718	39.814	3.0



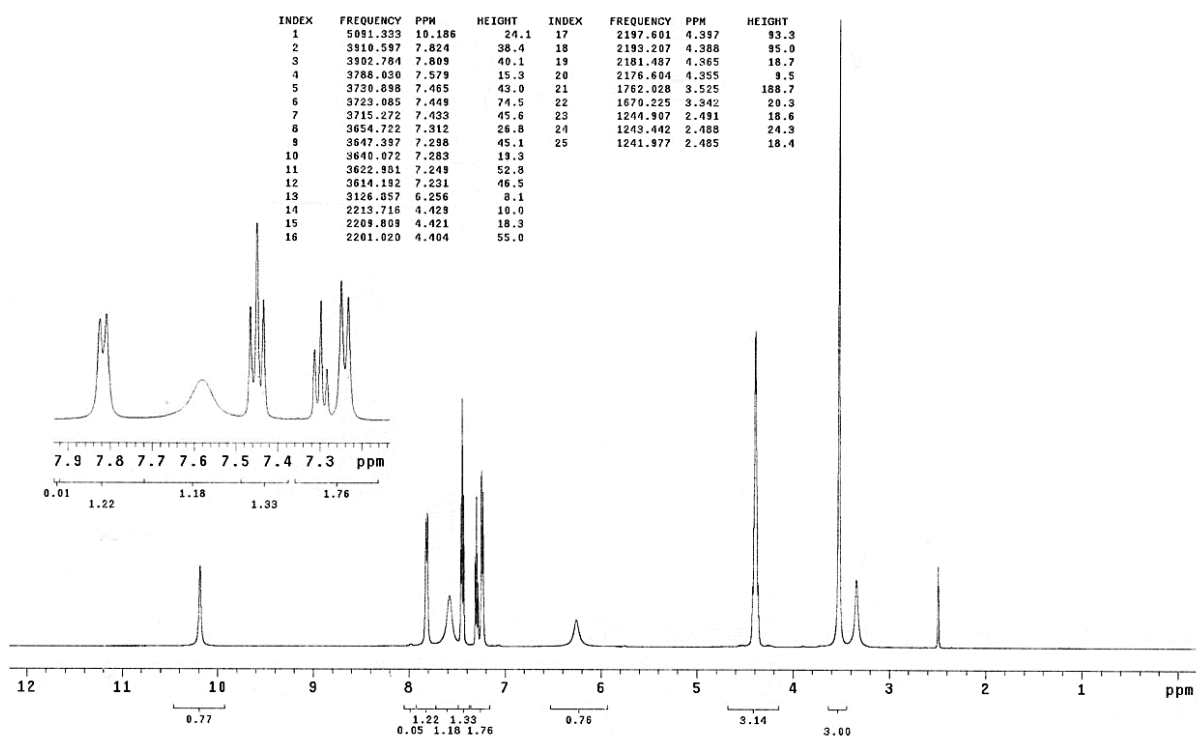
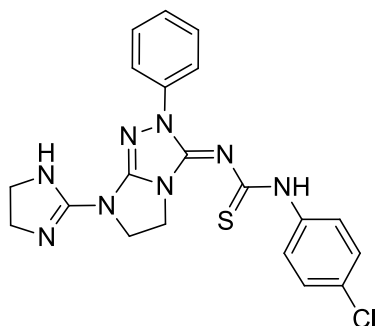
^1H -NMR (CDCl_3 , 500 MHz) spectrum of 1-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-3-(*p*-tolyl)thiourea (**7b**)



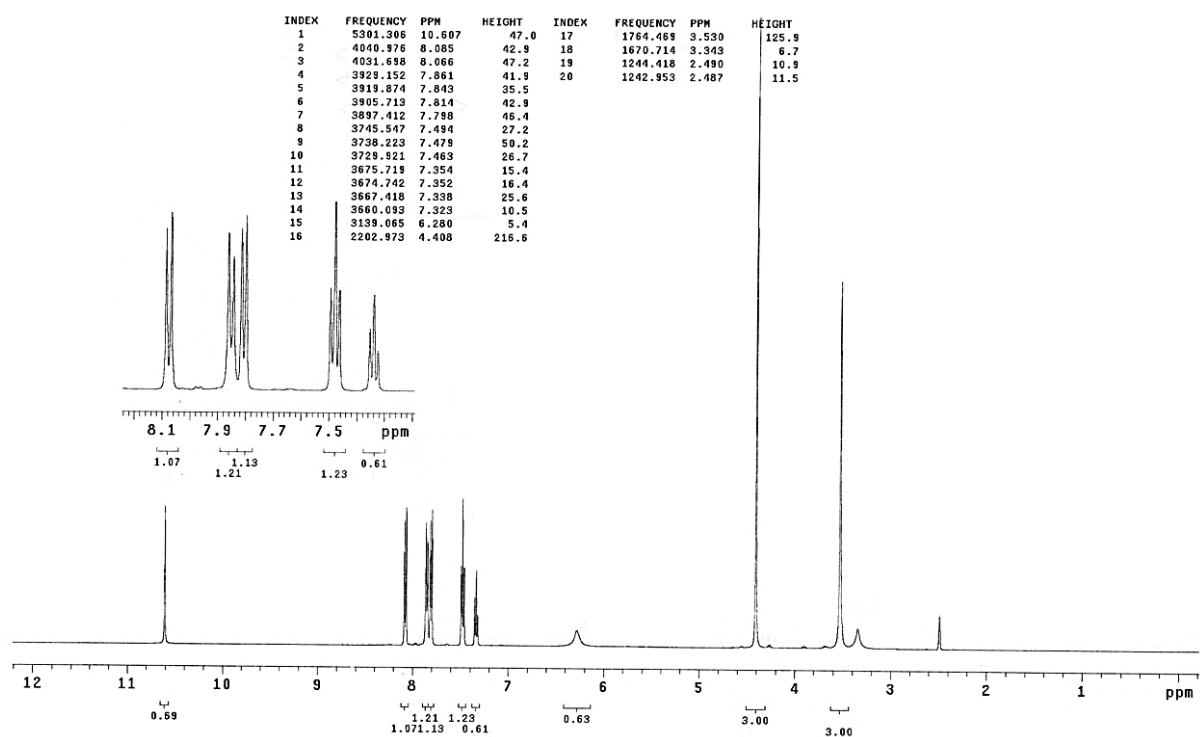
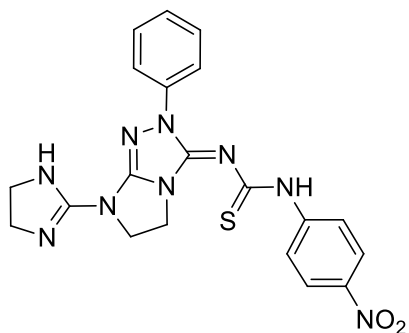
INDEX	FREQUENCY	PPM	HEIGHT
1	4045.849	8.095	5.1
2	3991.159	7.985	0.5
3	3881.289	7.766	10.0
4	3693.777	7.390	10.4
5	3644.458	7.292	7.6
6	3630.297	7.263	10.1
7	3507.731	7.018	8.3
8	3453.528	6.919	1.0
9	2751.337	5.505	0.9
10	2347.015	4.696	10.8
11	2255.213	4.512	11.7
12	2034.496	4.071	0.4
13	1879.213	3.760	5.8
14	1836.242	3.674	5.9
15	1133.074	2.267	21.2



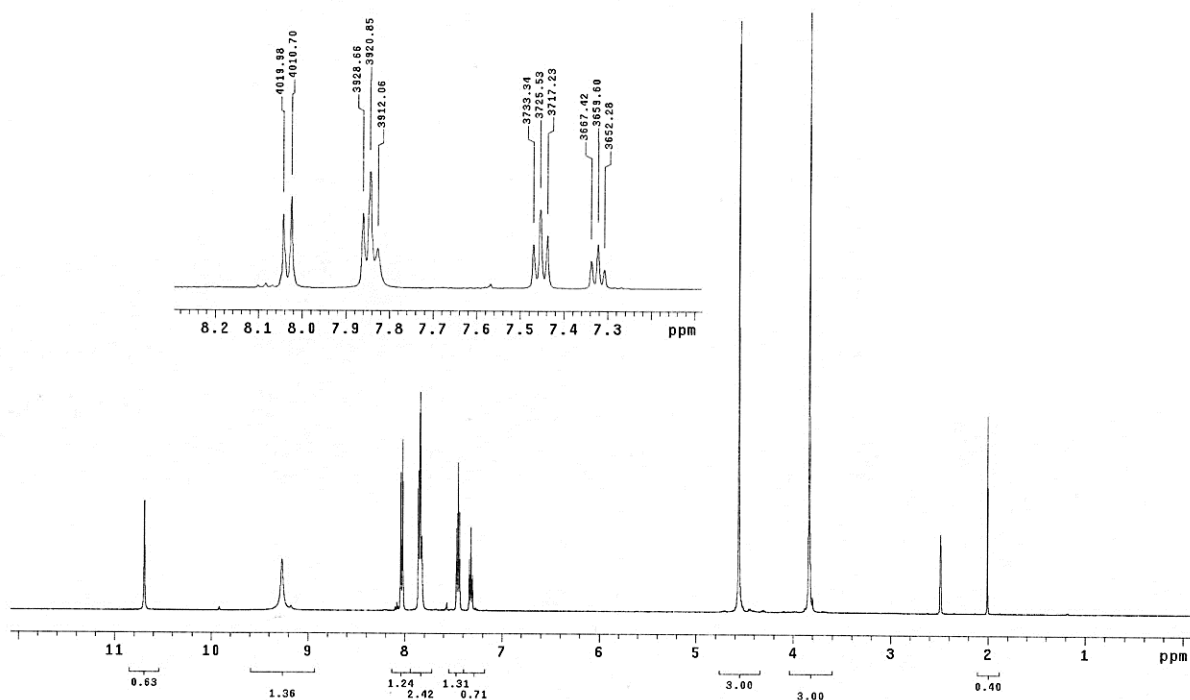
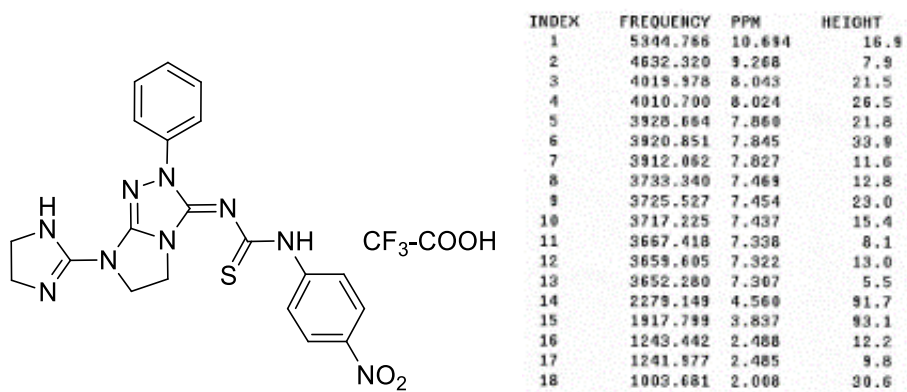
^1H -NMR (DMSO- d_6 , 500 MHz) spectrum of 1-(4-chlorophenyl)-3-(7-(4,5-dihydro-1H-imidazol-2-yl)-2-phenyl-6,7-dihydro-2H-imidazo[2,1-c][1,2,4]triazol-3(5H)-ylidene)thiourea (**7c**)



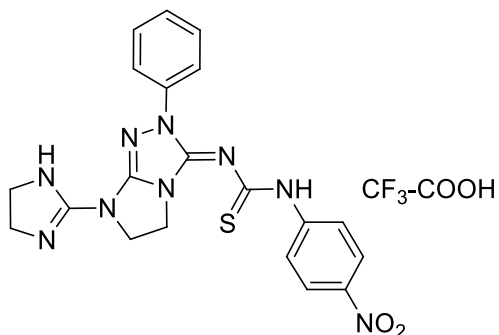
^1H -NMR ($\text{DMSO-}d_6$, 500 MHz) spectrum of 1-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-3-(4-nitrophenyl)thiourea (**7d**)



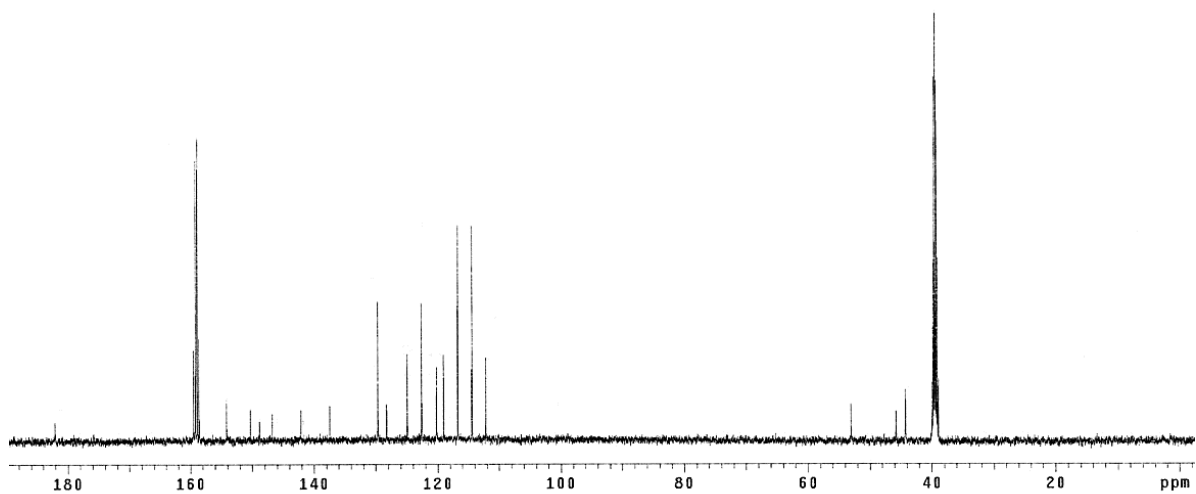
^1H -NMR (DMSO- d_6 +TFA, 500 MHz) spectrum of 1-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-3-(4-nitrophenyl)thiourea (**7d**)



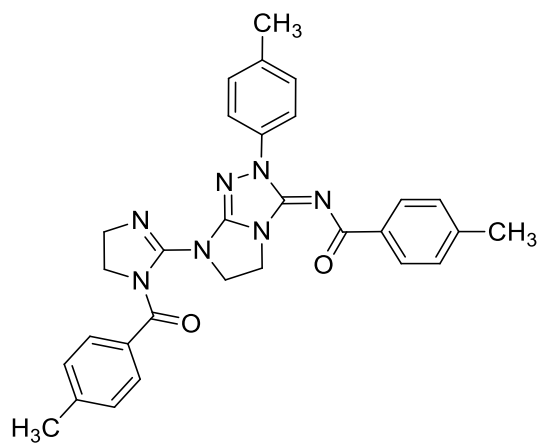
^{13}C -NMR ($\text{DMSO-}d_6$ +TFA, 125 MHz) spectrum of 1-(7-(4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)-3-(4-nitrophenyl)thiourea (**7d**)



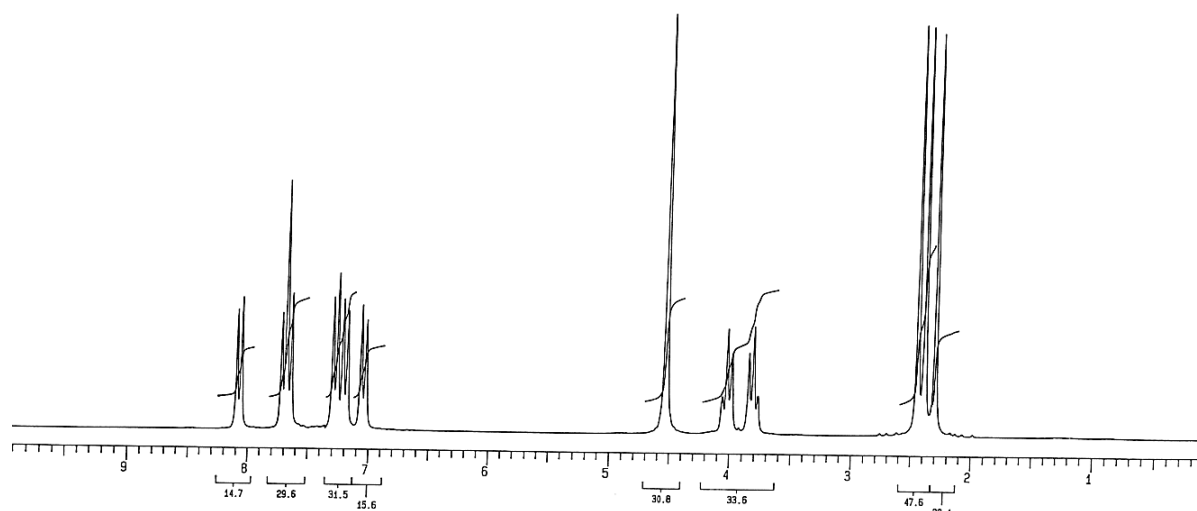
INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	22883.779	182.083	0.1	11	17269.777	137.413	0.2	21	6667.501	53.052	0.2
2	20053.286	159.561	0.6	12	16294.956	129.657	1.0	22	5752.399	45.771	0.2
3	20014.644	159.254	2.0	13	16120.630	128.269	0.3	23	5560.947	44.248	0.3
4	19875.564	158.943	2.1	14	15698.207	124.908	0.6	24	5027.161	39.961	0.4
5	19836.483	158.632	0.7	15	15409.713	122.613	1.0	25	5001.084	39.793	1.3
6	19371.789	154.138	0.3	16	15103.215	120.174	0.5	26	4980.007	39.625	2.5
7	18989.048	150.302	0.2	17	14857.870	118.018	0.6	27	4958.930	39.457	3.0
8	18703.466	148.821	0.1	18	14670.254	116.729	1.5	28	4937.852	39.290	2.5
9	18447.466	146.784	0.2	19	14382.638	114.441	1.5	29	4816.775	39.122	1.3
10	17859.060	142.102	0.2	20	14095.022	112.152	0.6	30	4895.698	38.954	0.4



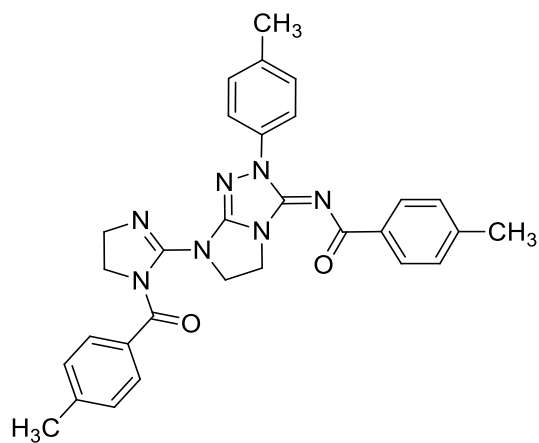
^1H -NMR (CDCl_3 , 200 MHz) spectrum of 4-methyl-*N*-(7-(1-(4-methylbenzoyl)-4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzamide (**8a**)



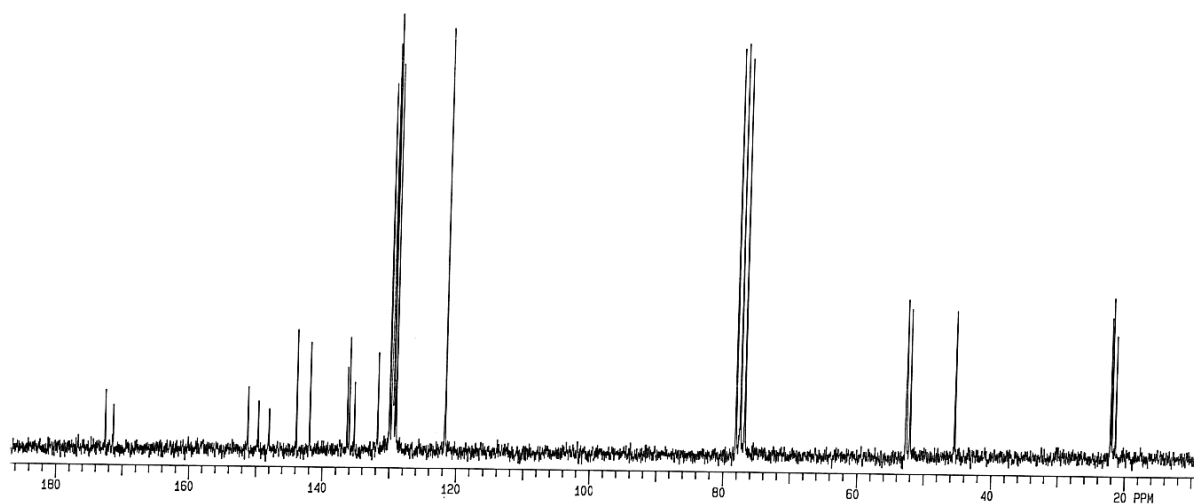
FREQ	PPM	INTENSITY	1405.48	7.028	33.289
1619.85	8.100	36.094	907.10	4.536	124.905
1611.78	8.060	39.722	912.78	4.064	11.834
1545.43	7.728	35.234	804.84	4.025	31.995
1537.26	7.687	74.333	797.47	3.988	24.702
1528.67	7.644	40.877	769.81	3.850	24.775
1460.47	7.303	39.940	762.61	3.814	32.815
1452.86	7.265	47.217	754.67	3.774	11.983
1444.18	7.222	38.458	490.02	2.450	122.338
1436.16	7.182	36.037	478.18	2.391	121.021
1413.03	7.070	37.703	460.73	2.304	119.958



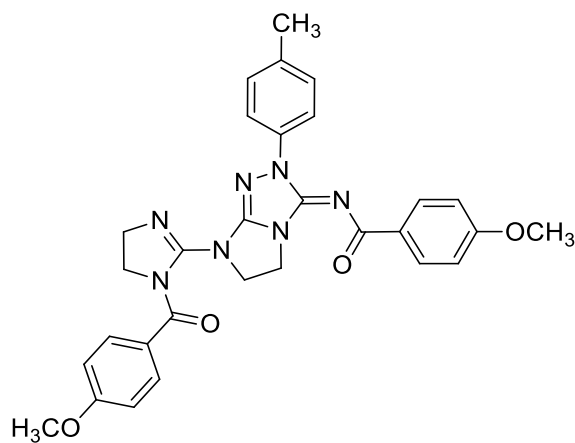
^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of 4-methyl-*N*-(7-(1-(4-methylbenzoyl)-4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzamide (**8a**)



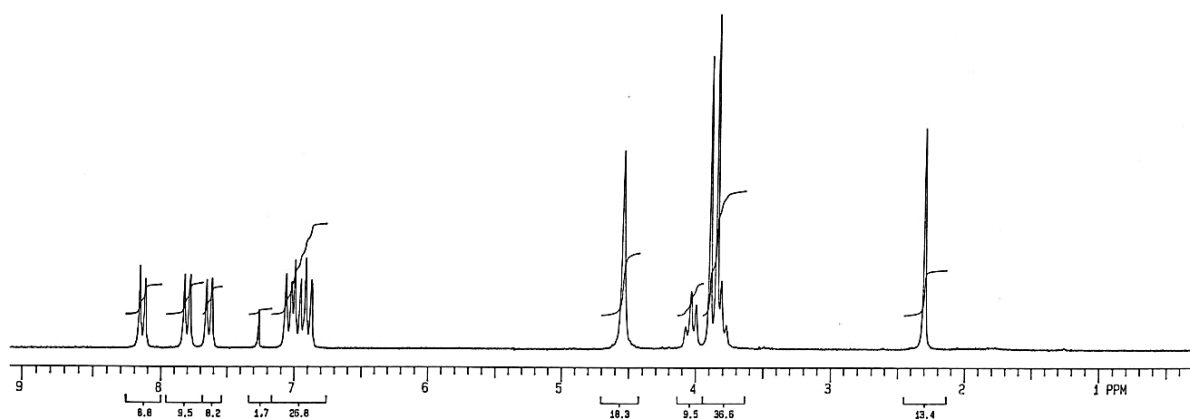
FREQ	PPM	INTENSITY	6516.4	129.579	121.312
8682.4	172.650	17.496	6508.3	129.417	131.361
8622.8	171.463	14.014	6493.4	129.120	117.676
7605.5	151.236	18.546	6119.3	121.681	125.964
7530.6	149.745	14.732	3930.4	78.156	121.881
7449.1	148.124	12.185	3898.5	77.521	124.299
7239.4	143.955	35.797	3866.5	76.886	121.786
7138.8	141.955	32.399	2650.4	52.704	39.840
6858.7	136.385	24.772	2646.4	52.623	46.815
6844.1	136.093	33.641	2619.7	52.093	44.463
6803.6	135.289	21.005	2285.7	45.451	43.889
6630.8	131.853	29.167	1517.3	30.172	9.725
6538.6	130.020	114.551	1115.2	22.175	43.075
6520.7	129.664	115.825	1107.1	22.015	47.913
			1077.5	21.427	39.584



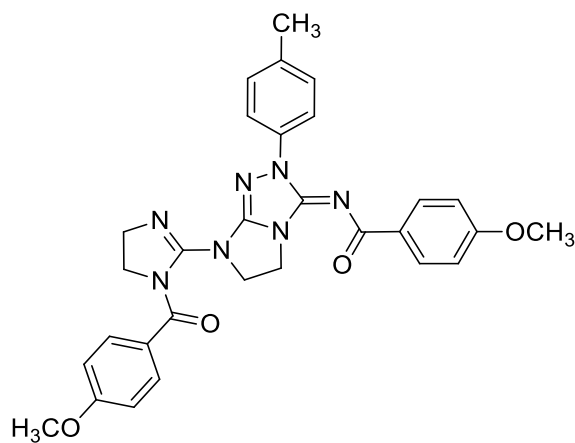
^1H -NMR (CDCl_3 , 200 MHz) spectrum of 4-methoxy-*N*-(7-(1-(4-methoxybenzoyl)-4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzamide (**8b**)



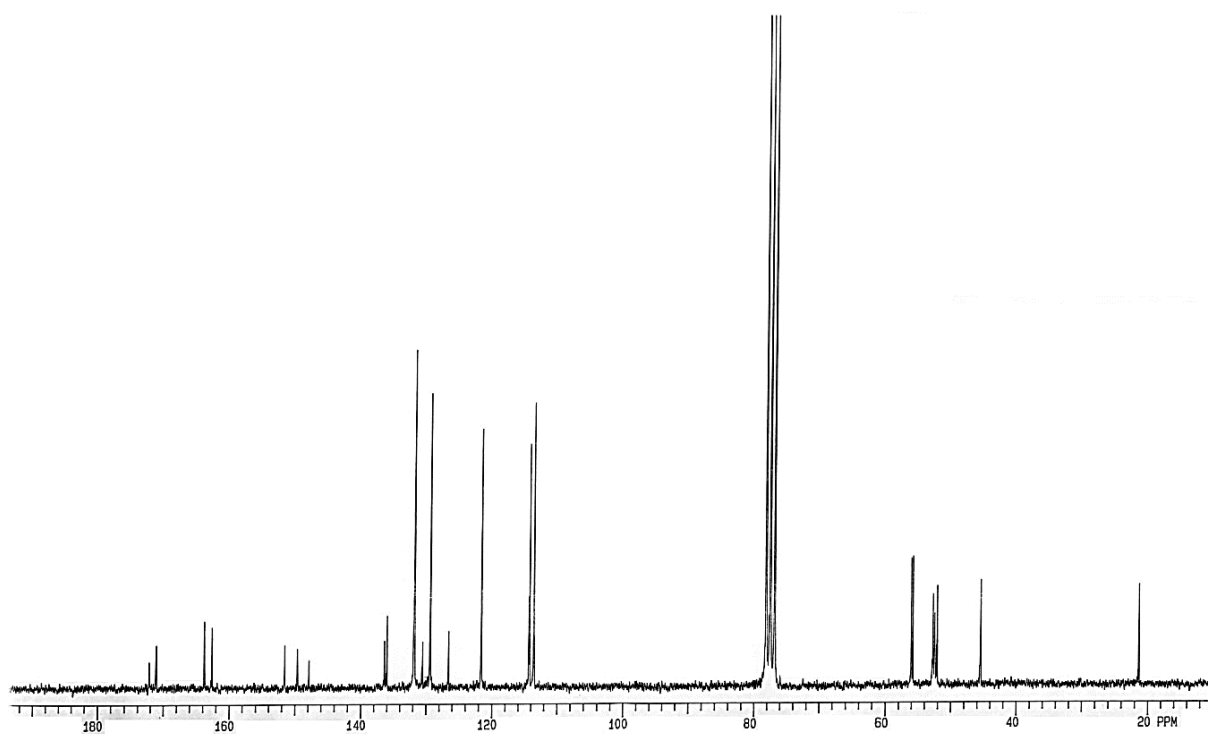
FREQ	PPM	INTENSITY	1398.37	6.993	26.191
1631.69	8.159	24.378	1389.58	6.949	20.582
1629.50	8.149	7.408	1382.25	6.912	26.708
1622.90	8.116	20.560	1380.05	6.901	8.146
1564.13	7.822	22.570	1373.46	6.868	20.271
1562.10	7.811	7.674	907.53	4.538	58.354
1555.30	7.777	22.704	814.78	4.074	6.877
1530.68	7.654	20.489	806.52	4.033	17.203
1522.17	7.612	20.743	799.11	3.996	13.219
1453.51	7.268	6.849	778.03	3.891	90.140
1452.21	7.262	11.457	767.98	3.840	98.215
1412.29	7.062	22.066	762.48	3.813	20.186
1403.86	7.020	19.814	754.79	3.774	7.246
			459.19	2.296	65.005



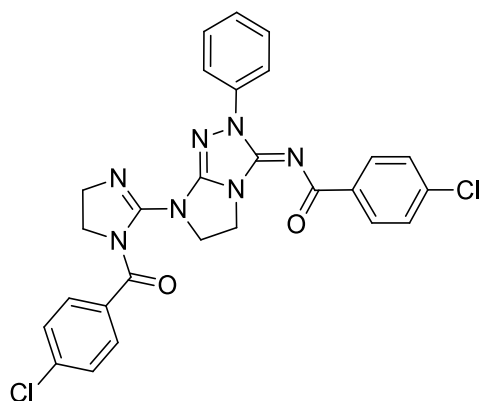
^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of 4-methoxy-*N*-(7-(1-(4-methoxybenzoyl)-4,5-dihydro-1*H*-imidazol-2-yl)-2-(*p*-tolyl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzamide (**8b**)



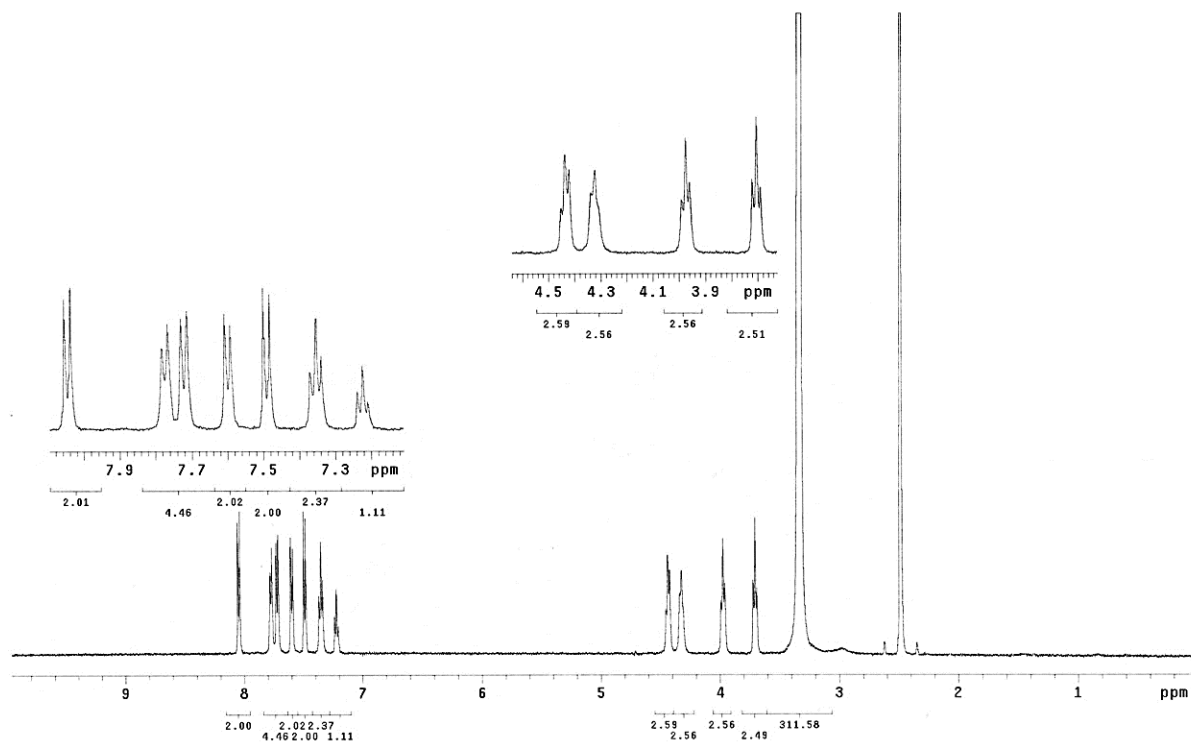
FREQ	PPM	INTENSITY			
8661.7	172.237	7.783	5745.0	114.239	10.620
8606.6	171.141	12.368	5712.8	113.598	85.142
8236.1	163.773	19.575	3947.0	78.485	4.348
8180.1	162.661	17.716	3929.3	78.133	394.366
7623.5	151.593	12.545	3907.4	77.699	20.787
7524.8	149.630	11.205	3897.4	77.498	408.127
7440.4	147.952	8.486	3865.3	76.862	400.819
6859.0	136.391	14.865	3853.4	76.625	4.864
6844.0	136.091	21.212	2819.4	56.064	37.918
6631.7	131.872	99.526	2807.6	55.830	39.425
6629.9	131.835	92.480	2654.0	52.775	28.176
6568.9	130.622	14.111	2639.4	52.483	21.771
6508.4	129.419	88.341	2622.6	52.150	29.427
6368.5	126.637	17.938	2287.6	45.490	31.094
6117.8	121.651	80.302	1077.1	21.419	30.647
5749.1	114.319	78.045			



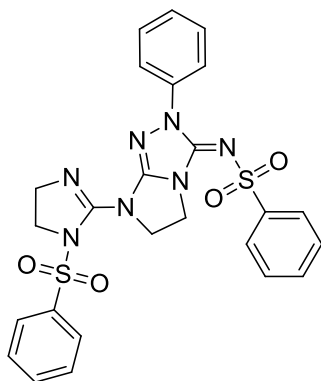
^1H -NMR ($\text{DMSO-}d_6$, 500 MHz) spectrum of 4-chloro-*N*-(7-(1-(4-chlorobenzoyl)-4,5-dihydro-1*H*-imidazol-2-yl)-2-phenyl-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzamide(**8c**)



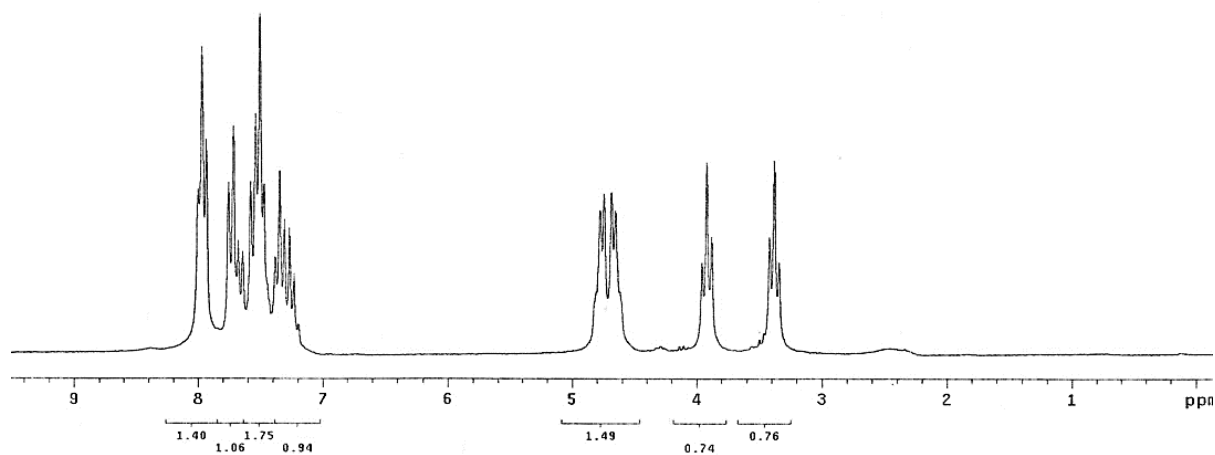
FREQUENCY	PPM	HEIGHT	3602.961	7.209	41.4
4027.303	8.058	198.9	2224.947	4.452	66.5
4018.513	8.040	216.7	2217.622	4.437	148.9
3890.088	7.783	123.7	2209.809	4.421	126.1
3881.786	7.766	160.6	2160.490	4.323	125.4
3863.719	7.730	169.1	1994.952	3.991	79.7
3803.168	7.609	176.6	1987.139	3.976	174.1
3794.867	7.593	159.2	1859.690	3.721	110.7
3748.966	7.501	216.2	1851.877	3.705	206.1
3740.176	7.483	205.8	1844.064	3.690	98.9
3684.020	7.371	87.1	1669.737	3.341	81372.7
3675.719	7.354	169.4	1658.018	3.317	1651.5
3667.906	7.339	111.3	1245.883	2.493	1575.2
3617.610	7.238	57.0	1243.930	2.489	2534.9
3610.285	7.223	96.7	1242.465	2.486	2380.0
			1240.512	2.482	1779.7



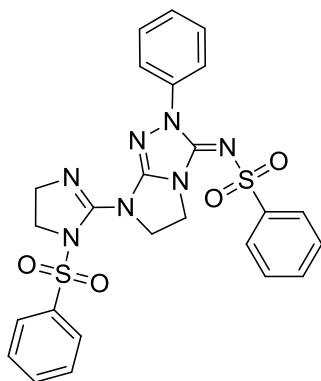
^1H -NMR (CDCl_3 , 200 MHz) spectrum of *N*-(2-phenyl-7-(1-(phenylsulfonyl)-4,5-dihydro-1*H*-imidazol-2-yl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzenesulfonamide (9)



INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	1600.277	8.003	31.6	11	1494.423	7.473	32.6	21	929.867	4.650	27.5
2	1594.466	7.974	59.1	12	1476.573	7.384	18.7	22	791.219	3.957	17.6
3	1587.409	7.938	41.2	13	1469.101	7.347	35.2	23	783.747	3.919	36.8
4	1550.464	7.754	32.9	14	1461.214	7.307	25.9	24	775.860	3.880	22.6
5	1542.992	7.716	43.7	15	1453.327	7.268	24.3	25	699.064	3.496	2.8
6	1535.520	7.679	21.9	16	1445.855	7.231	15.5	26	683.289	3.417	22.5
7	1528.048	7.642	19.8	17	1438.798	7.195	5.7	27	675.402	3.378	37.1
8	1515.594	7.579	33.1	18	954.774	4.775	27.6	28	667.930	3.340	17.6
9	1508.122	7.542	46.1	19	948.132	4.742	30.7				
10	1501.065	7.507	65.5	20	936.509	4.683	31.1				



^{13}C -NMR (CDCl_3 , 50 MHz) spectrum of *N*-(2-phenyl-7-(1-(phenylsulfonyl)-4,5-dihydro-1*H*-imidazol-2-yl)-6,7-dihydro-2*H*-imidazo[2,1-*c*][1,2,4]triazol-3(5*H*)-ylidene)benzenesulfonamide (9)



INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT	INDEX	FREQUENCY	PPM	HEIGHT
1	7546.923	150.095	4.9	11	6418.011	127.643	40.1	21	2267.493	45.096	16.1
2	7496.875	149.099	6.5	12	6374.490	126.777	19.7				
3	7222.263	143.638	3.6	13	6337.933	126.050	35.9				
4	7203.114	143.257	4.0	14	6146.010	122.233	38.8				
5	6905.871	137.345	6.0	15	3904.722	77.658	27.5				
6	6891.945	137.068	7.7	16	3872.952	77.026	27.9				
7	6750.940	134.264	19.3	17	3840.747	76.385	26.6				
8	6622.120	131.702	19.9	18	2694.426	53.587	16.2				
9	6516.366	129.599	39.5	19	2609.126	51.891	16.0				
10	6466.753	128.612	65.8	20	2522.521	50.168	18.0				

